Railway Age

DAILY EDITION

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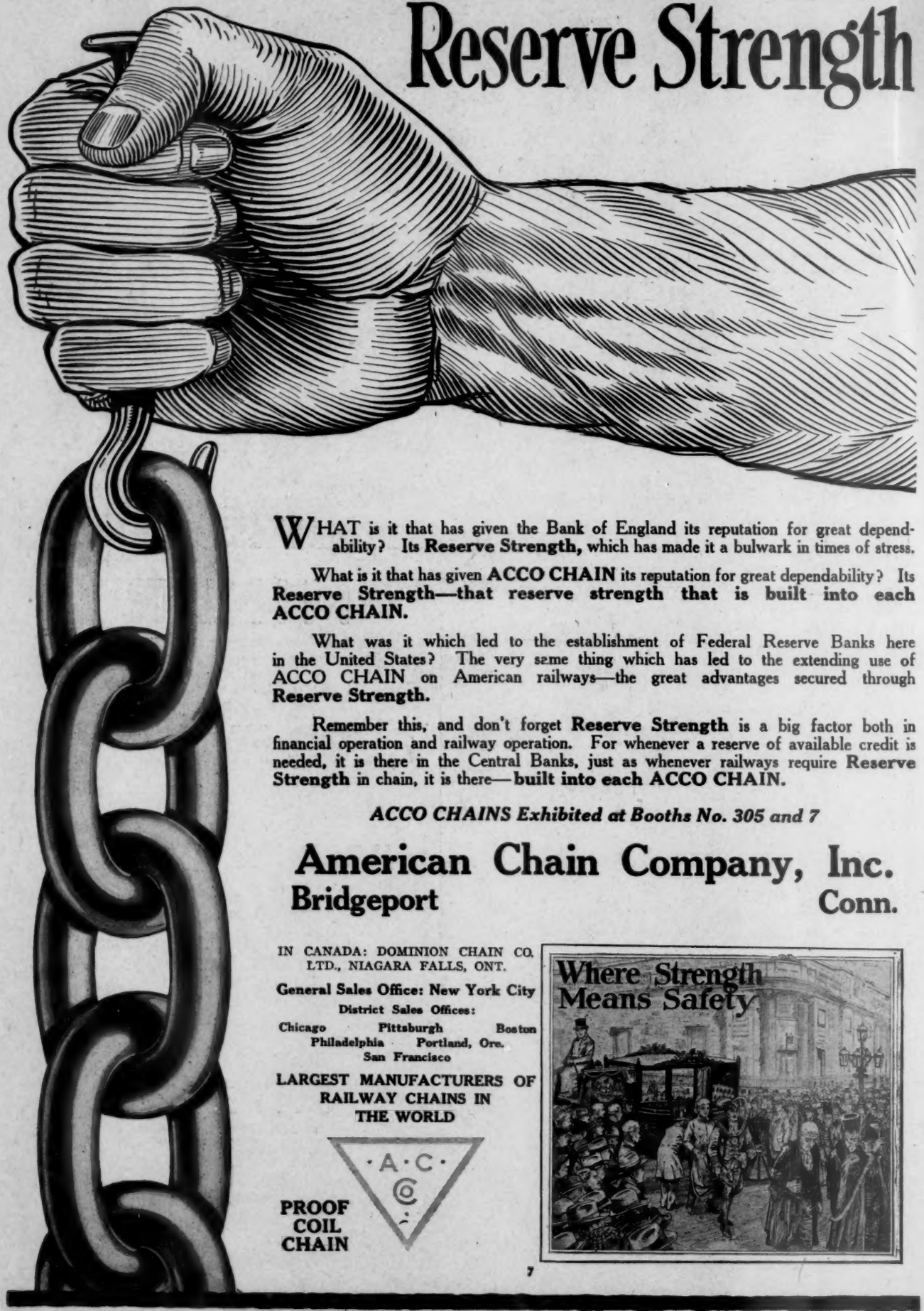
Reserve Strength



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7

Alphabetical Index to Advertisements Page 42

Railway Age

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

One of the most interesting events that have occurred on the Pier was the showing yesterday afternoon at the meeting of the Purchases and Stores Section of a moving picture of one of the Southern Pacific's supply trains. The presentation of the picture was in charge of J. E. Perry, general stores inspector of the Southern Pacific. The picture had been worked out in an excellent way, and was admirably adapted to show just how the supply train service is handled. It was seen not only by those here to attend the Purchases and Stores Section convention, but also by many mechanical officers and railway supply men. The picture is a striking exemplification of the way in which movies can be used to show new and improved methods used in railroad operation. No written description could make anywhere near so clear what a supply train is and the way its service is rendered.

The Supply Train Moving Picture

It would be interesting to make a comparison of the relative expenditures for tools for locomotive and car shops if the figures were available. The proportion spent for car shop facilities would probably be surprisingly low. The work on wooden parts has not increased appreciably, due to the prevalence of steel construction and the small amount of heavy work on steel cars during the first few years they are in service seems to have led to the conclusion that special equipment for this work was unnecessary except at a few large shops. It would be quite as foolish to allow men to frame draft timbers and similar parts by hand as to try to handle steel cars in a repair yard that is handicapped by having no more equipment than was provided for wooden cars. Yet this is the condition that actually exists at a great many shop points. Failure to provide necessary tools is a costly mistake even with cheap labor. With the wages now being paid to repair men the roads cannot afford to continue their neglect of steel car work. Unless more attention is given to this important subject the cost of car repairs will increase out of proportion to other mechanical department expenditures. Many of the early steel cars will require rebuilding in the next few years. There is an excellent opportunity to reduce the cost of this work by studying the requirements and installing labor saving machinery for handling it. This is not a problem for the future. Every day's delay is costly. The time to act is now.

Handicapping The Repair Track

If the suggestion made during the discussion of the paper on scheduling and routing systems is carried out, the car department will have a chance during the coming year to test this method of expediting work which has given such excellent results in locomotive shops. The question should be approached with an open mind and an earnest effort should be made to secure the greatest possible benefit from the scheduling system. It is hardly to be expected that the methods used in locomotive shops will prove applicable in the car shops without important changes, though its operation in passenger car work might be quite successful. The greatest benefit resulting from routing and scheduling work is the assurance that the various parts needed to complete the repairs will be ready at the proper time to enable the equipment to be finished on the scheduled date. On light repair work there are very few jobs that are done especially for the single car. Most of the parts are made in quantities to be placed in stock, and under these circumstances it is problematical whether the scheduling system would expedite the work enough to justify the additional expense involved. Even where diversified heavy repairs are handled it may not prove worth while. However, where heavy repairs are made to a limited number of different types of cars, the principles embodied in the scheduling and routing system modified to suit the conditions should prove valuable in saving time and reducing the cost of repairs.

Scheduling Systems For Car Shops

Altogether too little attention is paid to the importance of increased tap life and the production of tapped holes made possible by correctly grinding the flute taper and clearance. In many railway shops the method of procedure is to let broken and worn taps accumulate until finally a man is assigned the job of scrapping those that are too badly broken and sharpening the rest by grinding. With all due respect to experienced machinists who may be able to grind a tap correctly holding it by hand, the fact of the matter is that nine out of ten of these taps will not cut nearly as efficiently as if properly ground. When held by hand against a grinding wheel there is no means of determining whether the tap has the proper clearance or whether the clearance is the same on each flute. Too little clearance makes the tap cut hard and too much weakens it unnecessarily. There is also no certainty that the taper will be the same on each flute and, if not, the tap in entering a hole is thrown off center and cuts an imperfect thread; if all the work is done by one flute there is the additional liability of tap breakage, and more

Tap Grinding Machines

power is required to turn the tap. A machine or attachment for grinding taps correctly should be installed in every railway shop, because the initial cost of installation will be more than offset by reduced tap breakage and increased production of tapped holes. Any one who has ever tugged at the end of a five-foot pipe in tapping out washout plug holes, for example, will appreciate the advantages of having sharp taps, ground with the proper flute clearance and taper.

Do You Want Them?

When the convention opened the national shop agreement, in the minds of many, loomed up big as an obstruction to the future employment of college men in the capacity of special apprentices on our railroads. Frankly, we cannot see that there is any justification for this point of view at this time; there may have been when the Railroad Administration was in charge, assuming that it interpreted the agreement in such a way as to shut out college men. But it is not in control now. The agreement says absolutely nothing about special apprentices or technical graduates. Why read them into it? The agreement does have something to say about *training shop employees.* It has absolutely nothing to do with *training officers.* Regardless of the agreement it should not be forgotten that in pre-war days mechanical executives generally were hesitant over the practicability, or even the advisability of employing college men in the capacity of special apprentices. Do they really want them now?

A Lack of Incentive

The purpose of the interchange rules to give to all cars "equal care as to inspection and repairs, regardless of responsibility for expense of repairs," is clearly set forth in Rule 1. The most important factor affecting the accomplishment of this purpose is the scale of prices for labor and material to which billing charges for repairs to foreign cars must conform. The revisions proposed by the Committee on Prices for Labor and Materials in this year's report, if adopted, in most cases should remove the injustice of the inadequate prices now in force. But is not the policy of the association, expressed in the committee's report by the statement that "with the adoption of these proposed rules it will be possible to perform each item of work for other carriers, without resultant losses," attacking the problem from the wrong angle to bring about a real observance of the spirit of Rule 1? In commercial or industrial affairs it is not the assurance of freedom from loss that furnishes the incentive to accomplishment. The world's business structure is based on the prospect of profit. That this same principle applies to the car repair situation is amply demonstrated by the unsatisfactory conditions which have always existed in respect to foreign car repairs. Even under normal market conditions prices are subject to fluctuations, and it is impossible to establish a fixed scale of charges, some of which will not be in need of modification long before the revision of the scale as a whole can be practicably considered. It seems, therefore, that a scale which is intended never to show a profit will in some particulars always show a loss. The practicability and desirability of fixing prices for labor and material higher than the market, plus overhead, by a reasonable percentage deserves consideration. Such a scale would provide a margin within which an upward trend in prices would not produce actual losses to the repairing lines. But what is of greater importance, it would provide the only effective incentive for giving proper attention to foreign car repairs—the prospect of a reasonable profit.

Do We Expect Something For Nothing?

Some railroad men have an idea that college men are spoiled, that they require special privileges and have to be paid on a basis that is all out of proportion to their actual value as shop apprentices. They may be right—we are inclined to question it—but how much do we get in this world without giving something in return? Too many railroads expect the college man to concede everything! they are not willing to meet him half-way. He must surrender a part of his individuality, forget that he is a university graduate and work several years at an insignificant salary. And when he has mastered these preliminaries, he is generally the first to lose out with any change in the management. Would it not be worth something to your railroad if you were instrumental in making the young man stick? Would it not be a great personal satisfaction to know that your fatherly advice or kindly efforts were responsible for the young man's promotion to a position of responsibility on the railroads? This is a service that is never forgotten. Railroad men do not always understand the college man, they do not appreciate that it is not the mathematics he has studied that will make him a valuable man, but rather the rigorous mental training acquired during a formative period that makes him capable of analyzing problems scientifically and logically and deciding them on their real merit, which may not necessarily be the way they were decided last year, or the year before. We are all willing to pay the doctor a good fee because we know that his education required a lot of time and money. Why should we not show the technical graduate the same consideration?

Co-operate With Section VI

One of the strongest arguments advanced at the initial meeting of the Purchases and Stores Section for continuing their conventions in Atlantic City was based on an appreciation of the value of meeting in company with the Mechanical Section. Mechanical officers appreciate the compliment and it may be assumed that necessity for attendance in their own convention hall is the only reason mechanical men are not attending the Purchases and Stores meetings in greater numbers. Our railroads are a democratic organization to the core and whatever the duties and responsibilities of each department, no section can claim the ascendancy. The P. and S. electric sign on Young's Pier shines just as brightly as the others, and the mechanical and stores departments are rubbing shoulders and exchanging opinions and ideas with an intimacy that would be out of the question back on the railroad. The purchasing agents and storekeepers are tremendously in earnest. They are shouldering a big responsibility in these days, and if any mechanical officer is skeptical let him assume the responsibility of contracting for sufficient coal of a decent quality to keep his railroad running through the coming winter, or let him go out and buy boiler steel or tires, or any other of the forty thousand odd items that it takes to keep a railroad running, at prices that will not bankrupt the property. There has been a noticeable lack of understanding between the mechanical and stores departments that this convention should go a long way towards dispelling. Mechanical superintendents should get over the idea that the storekeeper is "holding out on them"; they should realize the fact that the stock book, which is in reality a statistical record of past consumption, is often a better index to future needs than the shop superintendent's estimate, and that an excess stock of any material represents a continuous drain on the treasury. Mechanical officers have

much to learn from the storekeepers—they should meet them half way. The advantages of a coincident convention at Atlantic City apply equally to all sections of the American Railway Association.

Boiler Hygiene

How did the plunge into the cool depths of the old swimming hole feel in the good old summertime? But what happened when you sometimes jumped in when you were overheated and did not take time to cool off? What happens to your locomotive boilers when they are hustled into a roundhouse after a strenuous run and doused with cold water? And what happens when these same locomotive boilers are summarily fired up and dispatched on another errand? Is it any wonder that locomotive boilers sometimes contract spinal meningitis as the result of such unmerciful treatment? After all, the boiler is not very different from the human and will respond to a plentiful cleansing dose of warm water just as will the human system. If you expect a soldier to fight you must feed him, said Napoleon. If you expect a boiler to do business you must wash him, says "The Man Who Saw." Not Monday, but every day should be wash day for the locomotive boiler, except where water conditions are exceptionally good. Boiler washing outfits suitable for engine terminals are not greatly in evidence among the convention exhibits. But perhaps that is because it is not an apparatus that can be easily set up in shape for exhibition. It is said that an ounce of prevention is worth a pound of cure, and on this theory it is unfortunate that suitable boiler washing apparatus is not as conspicuous among the exhibits as some of the internal treatments exhibited for curing boiler ills.

Do Some Real Thinking

In the discussions of several of the reports presented at yesterday's session the handicap which the rigid restrictions of the national shop agreement place on output received considerable attention. Who is to blame for this situation? What are its causes? These are questions the public discussion of which is very carefully avoided. The now generally unsatisfactory conditions did not develop without natural causes, and at the outset it must be recognized that these causes do not lie in the possession of unnatural human qualities by any class or group. What were accepted as sound principles in dealing with labor a few years ago, however, left largely out of consideration the fact that the whole problem is fundamentally one of human relationships. This omission is the cause of the growth of much suspicion and misunderstanding which has now led to the establishment of the incongruous and economically unjustifiable restrictions of the national agreement. Clear thinking, absolute fairness, and a willingness to forget past unpleasantnesses are essential to the re-establishment of satisfactory relations between the railways and their employees. One of the first points that must be clearly recognized is that in any cases where the national agreement is abrogated with good results in future, this will be done only after every possible effort has been made by the railroad management to get the point of view of its employees and to gain their co-operation in working out and adopting something better. It is all right, no doubt, to abuse the labor unions and the Railroad Administration for the national agreement, but it is quite possible it never would have existed if the managements of the railway companies had not themselves made some very serious mistakes in dealing with their employees.

Program For To-day

SECTION III—MECHANICAL

Discussion of reports on:

Couplers and Draft Gear	9.30 A. M. to 9.50 A. M.
Car Wheels	9.50 A. M. to 10.20 A. M.
Car Construction	10.20 A. M. to 10.50 A. M.
Safety Appliances	10.50 A. M. to 10.55 A. M.
Loading Rules	10.55 A. M. to 11.20 A. M.
Train Brake and Signal Equipment.	11.20 A. M. to 11.50 A. M.
Train Lighting and Equipment	11.50 A. M. to 12.20 P. M.
Subjects	12.20 P. M. to 12.30 P. M.

SECTION VI—PURCHASING AND STORES

Consideration of Rules of Order	9.30 A. M. to 10.00 A. M.
Report of Nominating Committee	10.00 A. M. to 10.30 A. M.
Election of Officers, General Committee and Nominating Committee	10.30 A. M. to 11.00 A. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

Lost Badges

No. 2164. I. W. Benson.
No. 8035. Mrs. M. A. Ross, care of The Buda Co.
No. 5428. John L. Nicholson, Locomotive Firebox Co.
No. 6879. D. E. Cooke, Chicago Pneumatic Tool Co.
No. 6863. J. W. Brice, Jr., The U. S. Metallic Packing Co.

A Large Machine Tool Order

SPEAKING OF BEING ON THE JOB, it is reported that on June 8 the Niles-Bement-Pond Company landed an order for $500,000 worth of shop equipment from the Atlantic Coast Line. A large number of roads are getting active on this class of purchases, among them being the New York, New Haven & Hartford; Long Island; New York Central; Erie; Delaware, Lackawanna & Western; Delaware & Hudson, and the Frisco.

Chairman Pearce Visits Section III

H. C. PEARCE, chairman of Section VI, Purchases & Stores, visited Section III yesterday to extend to its members an invitation to attend an exhibition of the moving pictures of the supply train service on the Southern Pacific.

He also made the following remarks:

"I also take the opportunity at this time to acknowledge the very courteous treatment your president has extended to our Section, and to me personally, and in recognition of the substantial help he has been to us.

"We have many things in common, in fact they are nearly all in common. By meetings of this kind, and the interchange of ideas through committees and conventions, we are bound to accomplish much in the way of unified helpfulness.

"I have just one subject that I wish to mention, and that is the minimum specification which Mr. Tollerton has handled with me, and which we believe will be of great benefit to us all. I will not take the time of your meeting to express what must appear to be very obvious, the great advantage of a minimum specification, and by co-operation between the two Sections, the users and the procurers, I feel that a very great work will be accomplished."

Grand Ball In Honor of Section VI

THE ENTERTAINMENT PROGRAM for the conventions was closed and the curtain run down last night at the conclusion of the Grand Ball in honor of the Purchases and Stores Section. The attendance, as was expected, again broke all records, not less than 3,000 people enjoying the evening's entertainment.

The feature of the ball was the grand march at 9.30 o'clock. Actual figures of the number in the line of march were not taken by the entertainment committee, but the estimate was that those taking part in the march last night exceeded in number the total of last Thursday night. Good dance music was furnished by the Taylor orchestra and refreshments were enjoyed between dances.

The Entertainment Committee in charge of the ball was composed of: W. M. Wilson, Chairman; L. O. Cameron, L. B. Sherman, R. J. Himmelright, Floyd Coffin, Horace Hager, Ellsworth Haring, William Melcher, I. C. Rogers and R. P. Townsend.

R. S. M. A. Committee Chairmen Appointed

NEWLY ELECTED PRESIDENT John F. Schurch, of the Railway Supply Manufacturers' Association, announces through the *Daily* his appointments of chairmen of the committees for the 1921 conventions. They are as follows:

Entertainment—R. J. Himmelright, American Arch Company, New York.

Exhibit—Charles W. Beaver, Yale & Towne Manufacturing Company, New York.

Hotels—Leroy S. Wright, The National Malleable Castings Company, Chicago.

Transportation—Harry E. Daniels, West Disinfecting Company, Chicago.

Enrollment—F. H. Smith, Gold Car Heating & Lighting Company, New York.

Finance—George A. Cooper, Frost Railway Supply Company, Detroit.

Registration Passes 6,000 Mark

YESTERDAY NOON, for the first time in history, the total registration at the conventions exceeded 6,000, reaching the record-breaking figure of 6,073. This was not entirely due to the fact that the Purchases and Stores as well as the Mechanical Section was meeting here, but to this and to an increase in attendance of almost all classes of visitors. The number of members of the Mechanical Section here exceeds all records. The detailed figures are as follows:

Members, Section III	875
Members, Section VI	364
Special Guests	785
Railroad Ladies	798
Supply Ladies	676
Supply Men	2,575
Total	6,073

These are the General Committee Members

THROUGH AN ERROR in the report of the proceedings of Section III, Mechanical, the names of the newly elected members of the Committee on Nominations were announced in yesterday's issue of the *Daily Railway Age* as having been elected members of the General Committee. The names of those who were elected members of the General Committe are as follows:

J. S. Lentz, Master Car Builder, Lehigh Valley.

H. R. Warnock, General Superintendent Motive Power, Chicago, Milwaukee & St. Paul.

C. E. Fuller, Superintendent Motive Power and Machinery, Union Pacific.

Willard Kells, General Superintendent Motive Power, Atlantic Coast Line.

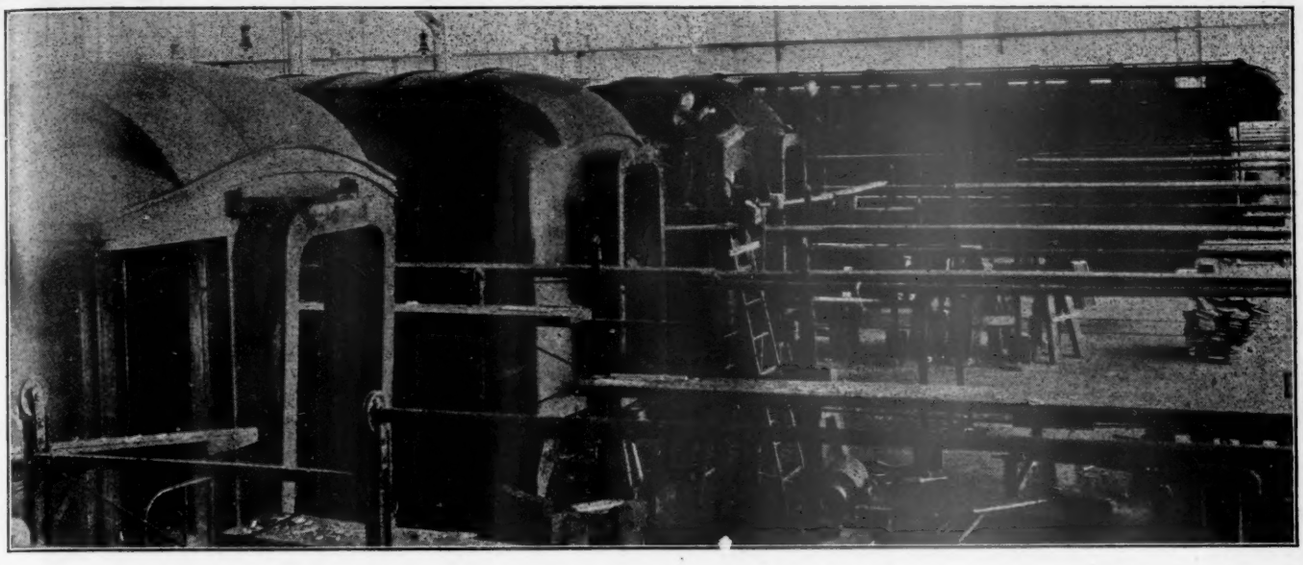
John Purcell, Assistant to Vice-President, Atchison, Topeka & Santa Fe.

H. L. Ingersoll, Assistant to President, New York Central Lines.

J. J. Tatum, Superintendent Car Department, Baltimore & Ohio.

Entertainment Committee

Top Row, Left to Right—W. B. Wise, John B. McClintock, I. C. Rogers, Elworth Harring, Gardner W. Taylor, H. A. Varney, J. W. Fogg, W. E. Greenwood, Langley Ingraham, J. R. Forney, William Melcher, Raymond P. Townsend, Horace Hager.
Bottom Row, Left to Right—L. O. Cameron, R. J. Himmelright, Dan Eubanks, W. K. Krepps, W. M. Wilson, S. W. Sargent, Floyd Coffin.

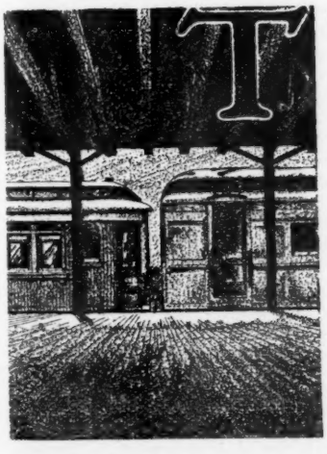


American Railroad Association—Section III—Mechanical

Several Important Reports Received Relating to Car Department Practices

Chairman Tollerton called the meeting to order at 9.45 A. M.

Revision of Passenger Car Rules of Interchange



THE COMMITTEE SUBMITS the following for your consideration:

Rule 7.—Change paragraph (12), Section (f), to read: "Wrought steel wheels may be substituted for cast steel or steel-tired wheels."

Rule 8.—Add following interpretation under paragraph (a):

Q.—What is known theft of parts of car occurring on handling line intended to cover?

A.—Where the handling line knows, beyond question of doubt, that the items were stolen while car was in their possession, the car owner can not be held responsible, and the missing material should be classed as a delivering line defect.

Change paragraph (g) to read: "Missing brake cylinders, reservoirs, triple valves, control valves, pressure retaining valves, cut-out cocks, angle cocks, air hose, steam hose, end steam valves, signal hose, and any portion of steam train line missing with end steam valves."

Change paragraph (h) to read as follows: "Burst or broken steam pipes and fittings, damaged steam valves, traps, and parts of same (inside of car), when due to freezing, on cars equipped with a combined steam heat cut-out and drain valve, also on cars equipped with hot water system of heating, except when accompanied by porter furnished by car owner."

Rule 10.—Change paragraph (b) to read: "This charge of five mills is to cover the expenses of operation, maintenance, depreciation and interest on the electrical equipment; therefore, all expenses incident to the operation and maintenance of such special features (except inspection, lubrication and distilled water for batteries) shall be charges against the car owner, unless due to unfair usage."

Rule 11.—Change to read as follows: "Information as to mileage made by cars must be furnished promptly on request of owners by railways over which cars are run, and when cars make no mileage on any calendar day the report must so specify."

Rule 13.—Make last sentence of "Answer" to "Interpretation" read: "Therefore, labor used in renewing or repairing other items is permissible at the rate per hour as shown in item 20 of Rule 21."

Rule 18—Change to read as follows: "The depreciation of all passenger equipment cars due to age shall be figured at three per cent per annum upon the yearly depreciated value of same, to continue not to exceed 50 per cent of its original value. The above method of depreciation applies equally to either body, air brakes or trucks of such cars. The excess cost of betterments applied, depreciated from the date of application, may be added to the depreciated value of the car."

Rules 20, 21 and 22—Change to conform with the recommendations of the Committee on Prices for Labor and Material.

The report is signed by H. H. Harvey (Chairman), Chicago, Burlington & Quincy; C. J. Nelson, Chicago & North Western; W. R. McMunn, New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; T. J. Boring, Pennsylvania; I. N. Clark, Grand Trunk, and C. S. Patton, Seaboard Air Line.

Discussion

The report was presented by H. H. Harvey (C. B. & Q.), who, in the course of his remarks, said: In regard to Rule 18, since the committee's report was written the committee on Freight Car Depreciation has gotten up a report which changes the basis of settlement for destroyed cars. If that report carries it will mean that the passenger car rules would also have to be changed, but it is my thought that that could safely go over another year because there are very few passenger cars destroyed.

Mr. Goodnow (C. & N. W.): *I move the report be accepted and approved.*

The motion, on being seconded and put to vote, was unanimously carried.

Report on Prices For Labor and Material

IN CONFORMITY WITH A MOTION carried at the 1919 convention, the committee continued the work of analyzing the prices for labor and material (as outlined by the Committee on Compensation for Freight Car Repairs in their report to the 1915 convention) and submits complete revision of present Rules 98, 101, 107 and 111 in freight, and Rules 21 and 22 in passenger car code.

Material prices set forth in the annexed recommendations for 1920-21 rules are representative of market conditions in February, 1920, basic prices having been obtained from the Chicago, Kansas City and Omaha offices of the Division of Purchases and Stores, and from eight railroads in same region. Suitable allowances were added to the basic prices to cover foreign, deadhead and distributing freight charges, direct and indirect store expense, fabricating labor when involved, and interest on stock investment, based on average monthly inventory balance multiplied by the interest rate, and the result divided by the total annual material disbursements.

Your attention is especially directed to Items 192 and 193 in proposed Rule 101 which would restore the practice of applying and charging the owner for second hand cast iron and cast steel wheels. It is felt that this will prevent the tremendous economic waste which has recently resulted through withholding cars from service during shortages of new wheels, and the resultant scrapping of serviceable second-hand wheels because of the low percentage of owned cars, to which they could be applied, which is now being operated by carriers. Prices of second hand wheels are fixed at 55 per cent of new prices so that exorbitant charges will not be made for applying them.

Scrap materials were averaged and market prices, less transportation charges to the scrap plant, were set up as credits.

Labor allowances (shown in hours and tenths) as proposed in the annexed report are felt to be representative of conditions prevalent today throughout the country, being in the main based upon 2,529 time studies conducted by the sub-committee in 1915 and 1916 at 34 shops in 27 cities throughout the United States and part of Canada. As most of the operations were performed at that time on piecework basis, the committee added a fixed percentage based on a study made by one large road covering 39,641 output hours, to such piecework hours in order to make the proposed time allowances more commensurate with the time being consumed today under a general day work system. The results were checked and supplemented with time consumed on four of the largest systems in the country.

The basic hourly rate for applied labor on wooden, steel and composite freight train car repairs throughout the country was found to be 65 cents, being a weighted average of 19,797 hourly rates paid on wooden, steel and composite freight car repairs by six roads.

Upon receipt of replies to its circular of December 13, 1919, the committee set up 48 per cent for direct overhead, (which is the figure reached by the Committee on Compensation for Car Repairs in their report to the 1915 convention), and 6 per cent for indirect overhead, or a total of 54 per cent to cover the expenses stipulated in Rule 107. This 65 cents per hour, plus 54 per cent, resulted in the $1.00 per hour labor allowance recommended by the committee.

The details of practically all items are radically modified to avoid inconsistent overlapping of labor, such as the inclusion of bolts, fascia and deadwood in the labor allowance for renewing sheathing, as set forth in interpretation of present rules.

With the adoption of these proposed rules, it will be possible for all roads to perform each item of work for other carriers, without resultant losses.

The report was signed by G. E. Carson (Chairman), New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; Ira Everett, Lehigh Valley; E. W. Smith, Pennsylvania; H. H. Harvey, Chicago, Burlington & Quincy; J. H. Milton, Chicago, Rock Island & Pacific; C. N. Swanson, Atchison, Topeka & Santa Fe; H. L. Osman, Morris & Company, and A. E. Smith, Union Tank Line.

Proposed Changes and Revisions in Rule 98

Bills rendered for material and labor cost of wheels and axles shall be in accordance with the schedule of prices, with the proper debits and credits as shown in Rules 101 and 107.

All non-A. R. A. standard axles shall be charged and credited at the average credit price shown in Rule 101 for such axles, except as follows: New non-A. R. A. standard axles applied, of odd over-all length or odd journal dimensions, for which A. R. A. standard axle can not be substituted, shall be charged at price, new, for such axle.

Items 201, 202 and 203 in Rule 101 shall cover new and average credit prices for non-A. R. A. standard axle.

For non-A. R. A. standard axles of a capacity other than those shown in Rule 101, Items 201, 202 and 203, use the new and scrap prices shown for A. R. A. standard axle of the same capacity; if the same capacity is not shown, use new and scrap prices shown for A. R. A. standard axle of the next lower capacity.

If new wheels and axles are substituted for average credit price wheels and second hand or average credit axle, proper charges and credits shall be allowed, although such substitution be made on account of only one loose or defective wheel or a defective axle, with the following exceptions; in case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged.

In Case of Owner's Defects

No credit will be allowed owner for loss of service metal due to turning off wheels. Should there be a further loss of service metal, however, due to the application of other wheels, the proper credit for such additional loss must be given the owner. Any increase in the amount of service metal, due to the application of other wheels, may be charged to the owner.

Delivering Line Defects

When repairs are not covered by defect card, the proper credit for any loss of service metal must be given the owner, at the rate of $2.21 for each ☆ in. of service metal removed, measured on radius of tread, in connection with full standard tread and contour, and charge shall be made against owner for any increase in the amount of service metal due to application of other wheel.

When the repairs are covered by the defect card of another company, charge covering such repairs shall be made against the owner of the car, the defect card and the billing repair card to be attached to the bill. The owner to render counter-bill on the authority of the defect card against the company issuing same, including an additional charge to cover the loss of service metal on account of the defects covered by the card. Should there be an additional loss of service metal, on account of the application of other wheels, the company making the repairs shall allow the proper credit to the owner to cover such additional loss of metal. Should there be an increase in the amount of service metal, due to the application of other wheel, such increase may be charged to the owner.

The above provisions shall govern any loss or increase of service metal on account of the mate wheel, even if same is not defective, when both wheels are turned off to correspond.

The necessary information must be given in all cases, as provided in Rules 9 and 10.

In cases of side-flat wheels, ⅛ in. for loss of service metal will be allowed for flat spots 2½ in. long, and ☆ in. for each additional inch or fraction thereof.

Any additional loss of service metal that it is necessary to remove on account of worn flange or tread must be borne by car owner.

Proposed Changes and Revisions in Rule 101

[The committee presented a complete comparison of the proposed and the present prices (including 30 per cent) for 214 items of material and for labor. In the latter case the increase was from $0.871 to $1.00 an hour.—Editor.]

Proposed Changes and Revisions in Rule 107

The following table shows the labor charge which may be made for performing the various operations shown. Unless otherwise specified, the labor allowances include all work necessary to complete each item of repairs.

All previous decisions or interpretations of the Arbitration Committee respecting labor charges in the A. R. A. Rules then effective which in any way conflict with the instructions set forth in each item of A. R. A. Rules 98 and 107 are hereby cancelled, effective with the adoption of the revised rule.

The labor charges of $1.00 per hour (Item 172, Rule 101, and $1.25 per hour, Item 443, Rule 107) in addition to including the actual labor cost of performing the work, include the following items of indirect expense:

Wages of foremen, work inspectors, clerks, laborers, etc., working on freight repairs.

Proportion of the expense of operating power plant and of wages of

shop or gang foremen, shop clerks, etc., whose time is not charged direct to freight repairs.

Shop switching, including repairs, depreciation, interest, taxes, fuel, lubrication, water, other supplies, fuel station and engine house expenses, wages of engnemen and firemen, switch crews and switch tenders.

Proportion of salaries and expenses of G. S. M. P. and M. and clerks, S. M. P. and M. and clerks, master mechanics and clerks, and general foremen.

[The table included in the proposed revision of Rule 107, presented a comparison of the present and the proposed number of hours, or changes allowed for performing 452 operations. Included in these were the following labor rates:

For straightening or repairing parts in place on damaged cars, $1.00 per hour proposed; $0.67 per hour present.

Repairing steel tanks of steel cars, $1.25 per hour proposed; $0.72 per hour present.—Editor.]

Rules 109 and 110

Remove second and third paragraphs of Rule 109.

Eliminate Rule 110.

Proposed Changes and Revisions in Rule 111

When angle cocks, cut-out cocks, pressure retaining valves and release valves, or detail parts of same, are renewed, ground in or otherwise repaired, account defective or missing, charge shall be made for complete cock or valve and average credit allowed according to prices shown in Rule 101.

[The present and proposed labor charges for air brake repair work were tabulated, a number of items as they appear in the present rule being eliminated in the proposed revision.—Editor.]

Passenger Car Rules 21 and 22

In addition to the proposed changes in labor charges shown in the table accompanying Rule 21, the following revision was proposed:

The labor prices as shown in Rule 111 for freight cars shall be used for ordinary quick-action triple valves, and for cylinders 14 in. or less in diameter on passenger cars.

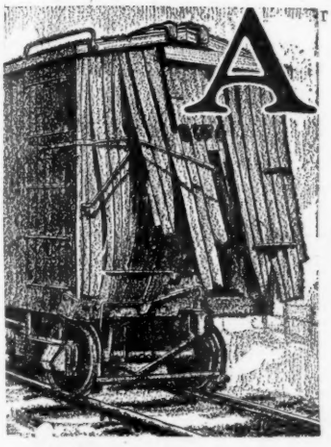
Changes in the charges for material shown in Rule 22 were presented in comparison with the present prices.

Discussion

The report was presented by G. E. Carson (N. Y. C.), Chairman of the committee.

C. E. Fuller (U. P.): *I move the report be accepted and printed in the proceedings, and that we approve the changes in the rules as reported by the committee. (The motion was seconded and carried.)*

Report on the Depreciation of Freight Cars



AT THE 1919 CONVENTION THE report of the committee was accepted only in so far as the recommended rate for depreciation is concerned, and was returned to the committee for further consideration.

The committee has held five meetings during the year and has also held two conferences with the following committee representing the Railway Accounting Officers' Association: *W. H. Williams* (Chairman), Delaware & Hudson; *H. D. Foster,* Chicago, Burlington & Quincy; *G. E. Bissonnett,* Union Pacific; *H. H. Laughton,* Southern Railway, and *J. W. Orr,* Pennsylvania.

Basis of Settlement

Present Interchange Rule 112 provides for three bases of settlement for destroyed or damaged cars. Cars built prior to October 1, 1914, are to be settled for at arbitrary values shown in the rules, depreciated from the date the car was originally built, plus an allowance for certain specified additions and betterments depreciated from the date applied. Cars built on or after October 1, 1914, are to be settled for on the basis of original cost price, new, depreciated from the date the car was built new, plus allowances for certain specified additions and betterments depreciated from the date applied. Bodies of refrigerator cars, stock cars permanently fitted for stall shipments, and other freight cars designed for special purposes, not referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, less the depreciation due to age, which latter shall be on the basis as for regular freight car equipment.

The committee recommends that the rule be amended to provide that destroyed or damaged freight cars be settled for on the basis of reproduction cost.

Method of Arriving at Reproduction Cost

The committee recommends that the reproduction cost of cars on which depreciation is figured be based on the per pound basis for the various classes of cars specified, with an additional allowance for wrought-steel wheels which shall be the difference between the cost of cast-iron and wrought-steel wheels.

The committee recommends that the Committee on Prices for Labor and Material determine the reproduction value of the various classes of cars as specified in the following table, and base the per pound price on the average cost of cars built in the United States and Canada; the prices for the year previous to the effective date in the rules to be determined annually and coninue in effect the same as the Rules of Interchange:

	Refgr.	Tank	All other
Class A—All steel.			
Class B—Steel underframe with steel superstructure frame.			
Class C—All steel underframe.			
Class D—All wood, with continuous metal center sill construction, with not less than 24 in. of sectional area between draft back stops, and with not less than one top or bottom cover plate from draft back stops to draft back stop.			
Class E—All wood, with not less than 8-in. continuous metal center sills *of not less than 18 lb. per foot per member,* with not less than one top or bottom cover plate from bolster to bolster. All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member,* with not less than one top or bottom cover plate from bolster to bolster. All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member,* securely fastened to wooden center sills not less than 4-in. x 8-in.			
Class F—All wood.			

NOTE 1—Cars which do not conform to Classes A, B, C, D and E, such as metal draft arms bolted to wooden sills, and cars with center sill sections, cover plates, etc., below those specified, shall be settled for as all wood cars under Class F.

NOTE 2—Where cast or pressed steel extensions are used and riveted to metal center or draft sills between bolsters, they shall be considered as continuous.

NOTE 3—Cover plate may be part top and part bottom, providing the specified length is covered.

Rate of Depreciation

The committee recommends the following rates for depreciation, straight depreciation basis, of freight cars to be prefaced with the following note:

These rules are for the purpose of settlement between carriers and between carriers and private lines, for destroyed or damaged cars, handled under the Rules of Interchange, and are not intended to be applied to cars of the same particular types in the accounting of individual carriers:

All steel	3 per cent
Steel underframe with steel superstructure frame	3 per cent
All steel underframe	3 per cent
All wood, with continuous metal center sill construction, with not less than 24 in. of sectional area between draft back stops, and with not less than one top or bottom cover plate from draft back stops to draft back stops	3½ per cent
All wood, with not less than 8-in. continuous metal center sills *of not less than 18 lb. per foot per member,* with not less than one top or bottom cover plate from bolster to bolster.	

All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member*, with not less than one top or bottom cover plate from bolster to bolster.	
All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member, securely fastened* to wooden center sills not less than 4-in. by 8-in.	3¾ per cent
All wood	4 per cent
All other cars	4 per cent
Tank cars for non-corrosive commodities	Same rate as other cars of similar construction.

Tank cars for corrosive commodities of any construction....4 per cent

NOTE—Depreciation rates as applying to different classes of cars include trucks and air brakes.

NOTE—A steel superstructure frame car indicates a car having the side and end uprights, braces and plates riveted together.

NOTE—Allowances for depreciation shall in no case exceed 80 per cent of the value new.

NOTE—On cars damaged or destroyed after March 1, 1919, depreciation shall be figured from month of the year built to month of the year damaged or destroyed. No fractional parts of a month to be considered.

Rebuilt Cars

It was the unanimous opinion of your committee that the so-called rebuilt cars should not be given any special consideration in making settlement when destroyed unless, in rebuilding, cars were made to form to certain construction standards. The committee therefore recommends the following addition to this rule to cover settlement for rebuilt cars:

A car may be considered as rebuilt and be so stenciled, when the cost of repairs (including additions and betterments) exceeds one-half of the cost of reproduction at actual cost new in kind at date of rebuilding, as shown in Section —— of the Interchange Rules on cars of similar type, provided the car, as to couplers, wheels and axles, brake equipment, and, center sill and end construction, was made to conform with the then existing A. R. A. Standards for reinforcing equipment.

If this recommendation is adopted it will be necessary for the Committee on Car Construction to provide immediately a standard strength requirement for the rebuilt car.

The report was signed by C. E. Chambers (Chairman), Central of New Jersey; J. Hainen, Southern; A. E. Calkins, New York Central; L. K. Sillcox, Chicago, Milwaukee & St. Paul; R. L. Kleine, Pennsylvania; J. W. Sasser, Norfolk Southern; W. J. Robider, Canadian Pacific, and H. L. Osman, Morris & Company.

Discussion

The report was presented by R. L. Kleine (Penn.), a member of the committee. After reading the report, Mr. Kleine said that, at the suggestion of the Tank Car Committee, a rearrangement of the headings would be made with the following additional notes. Note 4. The reproduction costs include the bodies and trucks. In the case of tank cars the trucks are included with the underframe. Where tank cars are built without underframes the couplers, draft gear and brakes are to be included with the trucks; the remaining fittings, such as saddles, striking castings, etc., are to be included with the tank. Insulation and jackets are part of the tank.

After the item near the bottom of page 4, "All other cars.... 4 per cent.", Mr. Kleine said: In order to be consistent with the change on the preceding page, we depreciate the tank car underframe with the truck the same as with other cars, and make a change in the tank itself, depreciating the tank separately. Therefore, we suggest a change in the next two items, making then read as follows:

"Tank cars for non-corrosive commodities, 3 per cent.", or in other words, the same as for steel cars.

"Tank cars for corrosive commodities of any construction, 5 per cent."

C. F. Giles (L. & N.): Under the caption of "Method of Arriving at Reproduction Cost," I note that an additional allowance is made for wrought steel wheels. I would like to ask Mr. Kleine why no additional allowance is made for cast steel wheels; they are being used very largely in freight service, and some consideration I think should be given to them.

Mr. Kleine: We considered the cast steel wheel, but felt that the cast steel wheel was more or less experimental, not a standard of the Association, and a one-mileage wheel. In other words, the committee confined itself to the present standards of the Association.

Mr. Giles: *I move that the committee be instructed to make a provision for an additional allowance for cast steel wheels.*

The motion was seconded and on being put to vote, was unanimously carried.

Mr. Giles: *I move you that the report be accepted and submitted to letter ballot.*

Mr. Fuller: *I second the motion.*

Mr. Kleine: As this is an interchange rule matter, I do not see why it should go to letter ballot. It should be adopted the same as the interchange rules on the floor of this convention.

F. W. Brazier (N. Y. C.): If the question of Rebuilt Cars hasn't been a bugbear to all of us I don't know what has, and now you have something which is complete. If we wait to get a letter ballot and get the different opinions we won't know where we are at, and I want to stand by Mr. Kleine's report.

Mr. Giles: *I will withdraw that part of my motion that it be submitted to letter ballot, and move that it be accepted and printed in the papers.*

Mr. Fuller: *I accept the amendment, and second the motion.*

The motion, on being put to a vote, was unanimously carried.

Report of the Arbitration Committee

THE COMMITTEE, during the year, has decided cases 1156 to 1170, inclusive, and copies have been sent to the members. A vote of concurrence in the decisions is requested by the committee.

With the approval of the General Committee this committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the rules. These interpretations have been issued in Supplements Nos. 1 and 2 to the Rules of Interchange.

Effective March 1, 1920, with the return of the railroads to private control, all modifications of the Interchange Rules having special application only to railroads under U. S. Federal control as indicated in the rules, were cancelled, being superseded by the general rules.

The changes in the Rules of Interchange promulgated in Supplements Nos. 1 and 2 will be made in the rules when reissued, with the exception of changes in prices for labor and material, which will be revised in accordance with action taken on report of the Committee on Prices for Labor and Material.

The committee did not this year request the members, railroad clubs, etc., to submit recommendations for changes in the rules; however, all recommendations received have been considered and where approved, changes have been recommended. The committee has also considered the necessity for changes in the rules as developed in connection with the various decisions and interpretations rendered during the year.

Recommended Changes in the Rules of Interchange

(Proposed changes in the present rules are printed italics.)

RULE 2.

The committee recommends that the following paragraph be added to this rule as the third paragraph of Section (b):

Cars using lighting outfits operated by gasoline engines will not be accepted in interchange.

The committee recommends that Section (c) of Rule 2 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 2, section (c). Cars improperly loaded (not complying with the Loading Rules) when transfer or rearrangement of lading is necessary.

Cars of 80,000 lb. capacity and over, equipped with A. R. A. Standard axles, may be loaded to maximum shown in Column "A" of Rule 86, which is the total weight of car and lading for the respective capacities given.

PROPOSED FORM.—Rule 2, section (c). Cars improperly loaded (not complying with the Loading Rules) when transfer or rearrangement of lading is necessary.

Cars loaded in excess of the maximum of Column "A," table under Rule 86, which is the total weight of car and lading on rails for respective dimensions of axles shown.

RULE 3.

The committee recommends that the effective date of second paragraph, Section (d) of Rule 3, be extended to October 1, 1922, in accordance with proposed form shown below:

Cars built prior to October 1, 1915, will not be accepted in interchange after *October 1, 1922,* unless equipped with A. R. A. Standard axles.

The committee recommends that the effective date of the first paragraph, Section (h) of Rule 3, be extended to January 1, 1922, and that the rule be modified in accordance with proposed form shown below:

PRESENT FORM.—Rule 3, section (h). After October 1, 1920, no car will be accepted in interchange unless the body is stenciled light weight and capacity in pounds, as provided for in Rule 86. Tank cars shall be weighed and stenciled by the tank car companies only, or by authorized representatives of the tank car companies.

After October 1, 1918, when cars equipped with short draft arms receive general repairs, long metal draft arms extending beyond the body bolster, steel draft members extending full length of car, steel center sills or steel underframes must be applied.

PROPOSED FORM.—Rule 3, section (h). After *January 1, 1922,* no car will be accepted in interchange unless *car* is stenciled *maximum load, light weight and total weight* in pounds, as provided for in Rules 30 and 86.

Tank cars *and refrigerator cars* of private ownership shall be weighed and stenciled by the *owner* only, or by authorized representative of the *owner.*

After October 1, 1918, when cars equipped with short draft arms receive general repairs, long metal draft arms extending beyond the body bolster, steel draft members extending full length of car, *transom draft gear,* steel center sills or steel underframes must be applied.

The committee recommends that the effective date of Section (i) Rule 3, be extended to October 1, 1922, and the rule modified in accordance with the form shown below:

PROPOSED FORM.—Rule 3, section (i). After October 1, 1922, no car with trucks of less than 60,000 lb. capacity will be accepted in interchange unless equipped with wooden or metal draft arms extending beyond the body bolster, or metal draft arms integral with body bolster, or metal draft arms extending to metal body bolster and securely riveted to same, *or transom draft gear.*

RULE 4.

The committee recommends that the second paragraph of this rule be modified in accordance with the proposed form shown below:

PROPOSED FORM.—Rule 4, (second paragraph). Defect cards shall not be required for any damage so slight that no repairs are required, nor for raked or cornered sheathing, roof boards, fascia, or bent or cornered end sills, not necessitating the shopping of the car *before reloading.*

RULE 9.

The committee recommends that the requirement for showing on billing repair cards, the markings on axles R and R be eliminated.

RULE 17.

The committee recommends that an additional paragraph be added to the answer of Interpretation No. 7 of this rule as shown in Supplement No. 1 to the Rules of Interchange, the interpretation to read as shown below:

PROPOSED FORM.—Rule 17, (Interpretation No. 7):

Q.—Does the substitution of A. R. A. Standard K-1 and K-2 triple valves for valves of other types constitute wrong repairs for which defect card should be issued? If not, what should be the basis for charge and credit?

A.—No. A. R. A. Standard K-1 and K-2 triple valves may be substituted for any non-Standard valves if applied to proper size equipment. In the substitution for any convertible non-Standard valve, the charge and credit shall be on the basis of the conversion price ($10.00) plus allowance for removing, repairing and replacing triple valves, as per Item No. 29, Rule 111. In the substitution for non-convertible valves on cars built prior to January 1, 1915, charge and credit shall also be on the same basis. In the substitution for non-convertible valves on cars built on or after January 1, 1915, charge and credit shall be on basis of prevailing price for K valves, plus A. R. A. average price for removing, repairing and replacing, as per Item No. 29, Rule 111, with *average* scrap credit *($1.00)* for non-convertible valve removed. *When Standard A. R. A. valve K-1 or K-2 is applied to replace any non-Standard A. R. A. valve, the stenciling on car body showing valve standard to the car must be changed to conform to valve applied, for which ½ hour labor may be charged.*

When any valve applied is of different type from that removed, or from that standard to the car, the billing repair card must also show valve standard to the car, as indicated by the stenciling on car body; also show date built for car on which K-1 or K-2 valve replaced any non-convertible valve.

RULE 30.

The committee recommends that Rule 30 be modified in accordance with the proposed form shown below. (The present form of section (a) in which the most important changes are proposed is shown also.)

PRESENT FORM.—Rule 30. (a) All freight cars shall be light weighted as follows; and shall be marked in accordance with A. R. A. Interchange Rules with the following marks:*

(1) The light weight, which shall be the multiple of 100 lb. nearest the scale weight, except that when the scale weight indicates an even 50 lb. the lower multiple shall be used.

(2) Capacity in pounds. Cubical capacity, except for flat and tank cars.

(3) Station symbol.

(4) Date of weighing, month and year.

(5) Each new car must be weighed separately and marked at the car works, under the supervision of the owner's inspection. The accuracy of the scales used must be certified to by a railroad-scale inspector appointed by the car owner.

These provisions to be incorporated in the contract covering the purchase of the equipment.

PROPOSED FORM.—Rule 30. (a) All freight cars shall be light weighted as follows; and shall be marked in accordance with A. R. A. Interchange Rules (M. C. B.) with the following marks:*

MAX LOAD 000 000 lb.
LIGHT WT 00 000 lb. New 0-'00

TOTAL WT 000 000 lb.
CUBICAL CAPACITY (except for flat and tank cars)
Station symbol
Date of weighing, month and year.

TOTAL WT is the total allowable weight of car and lading (including temporary racks, false floors, bracing, cooperage, ice in bunkers, etc.) on rails, as indicated in the table of A. R. A. Interchange Rule 86.

LIGHT WT *shall be* the multiple of 100 lb. nearest the scale weight of empty car, except that when the scale weight indicates an even 50 lb. the lower multiple shall be used.

MAX LOAD shall be the difference between the total weight and light weight, and represent the maximum net weight of lading (including temporary racks, false floors, bracing, cooperage, ice in bunkers, etc.) which may be carried on car.

Letters and figures shall conform to the standard of the section for lettering and marking of freight cars.

(b) Each new car must be weighed separately and marked at the car works, under the supervision of the owner's inspection.

* Tank cars and refrigerator cars of private ownership shall be weighed and stenciled by the owner only, or by authorized representative of the owner.

The accuracy of the scales used must be certified to by a railroad-scale inspector appointed by the car owner.

These provisions to be incorporated in the contract covering the purchase of the equipment.

(c) Wooden and steel underframe cars (except refrigerator cars) should be reweighed and remarked each year during the first two years the cars are in service and thereafter once every two years. All-steel cars and all refrigerator cars should be reweighed and remarked at least once every three years. This weighing should be done at any favorable time during the year in which the car is due to be weighed, regardless of the month in which the previous weight was obtained. This paragraph does not apply to tank cars.

Effective July 1, 1920, for cars not due for reweighing, where the marking does not conform with that shown in Section (a), cars shall be restenciled in accordance therewith. If this work is performed by other than car owner charge shall be made in accordance with A. R. A. Interchange Rule 107.

(d) When a car is materially changed by repairs, alterations or repainting, it should be reweighed and remarked. (See paragraph (f) (8).)

(e) Any car without marking should be immediately weighed and marked. Any car (except tank cars) which has not been reweighed and remarked within the prescribed period should be immediately reweighed and remarked. If the car (except tank cars) is reweighed at any time and is found to have a variation of 300 lb. or more (for refrigerator cars, 500 lb. or more) between the marked and actual weight, it should be immediately remarked.

(f) (1) When empty cars are received in yards for inspection for defects, or while empty cars are on shop tracks for repairs, there should be selected the cars whose condition and whose date of last weighing, etc., indicates that they should be reweighed and remarked. The number of cars selected will be regulated in accordance with facilities and traffic conditions.

(2) The initials and numbers of cars selected, *total weight* and old light weight marks shall be reported to the weighmaster on the prescribed blank.

(3) Cars should then be cleaned and swept out under the supervision of the yardmaster or some one especially designated.

Cars should be dry and free from snow, ice, *temporary* false floors, removable stakes, posts, or anything else affecting the weight.

(4) Missing parts, such as side or end doors, or parts peculiar to certain types of cars, should be replaced and included in the *light* weight.

(5) Temporary double decks in stock cars should be removed before cars are weighed.

(6) The old *stencil* marks *shall* be entirely painted out with quick-drying paint (*including former nominal capacity marks*).

(7) Before cars are weighed, the accuracy of the scale must be regularly certified by the scale department, scale must be properly balanced and free from interference, and the weighmaster must know that cars are clean and that paragraphs (3) and (4) have been complied with.

(8) Cars should not be light weighed during rain, snow, sleet or heavy winds; except that when cars have been materially changed by repairs, alterations or repainting they must be weighed and remarked, even if it is necessary to do so under unfavorable weather conditions.

(9) Cars should be light weighed at rest, uncoupled and free at both ends.

(10) The *light* weight *and maximum load weight* so obtained, *as well as the total weight, as per A. R. A. Interchange Rule 86,* should be furnished immediately on the prescribed blank to the car marker who will mark the car as provided in paragraph (a). When desired, any portion of the marks which will not be changed may be marked on the car before reweighing.

Complete reports of such reweighing and remarking should be forwarded on prescribed form to the designated transportation and mechanical officers and a copy retained by weighmaster.

(g) When a car is remarked the car owner should be notified of the old and the new weights, with place and date. The proper officer to whom these reports should be made will be designated in The Official Railway Equipment Register.

(h) Whenever a weighmaster at a point not equipped for marking freight cars as provided in paragraph (f), the light weight of a car which is not marked in accordance with this rule, he shall attach to the car the prescribed "Light Weight Card" with the light weight and send two copies of the card to the designated officer of the railroad on which the scale is located, one copy to be sent to the owner of the car. The presence of the Light Weight Card on the car shall be authority for remarking the car at first available station.

RULE 31.

The committee recommends that Rule 31 be modified in accordance with the form shown below:

PROPOSED FORM.—Rule 31. The reweighing *and remarking* of cars provided above to be charged to car owner, except when the weight of the car is changed on account of repairs due to unfair usage; when such repairs are made on authority of defect card, charge for reweighing may be included on same authority.

RULE 32.

The committee recommends that Section (d) of Rule 32, be modified in accordance with the form shown below:

PROPOSED FORM.—Rule 32, section (d). Collision, or impact other than that occurring in regular switching, *such as:*

(*1*) *Misplaced switches.*

(*2*) *Wrong or misinterpreted signals or failure to observe signals.*

(*3*) *Letting cars get away on incline.*

(*4*) *No rider protection when necessary.*

(*5*) *Coupling on with locomotive at speed exceeding limits of safety.*

The committee recommends that the last paragraph of Rule 32 be modified in accordance with the proposed form shown below:

PROPOSED FORM.—Rule 32, (last paragraph). Defect cards shall not be required for any damage so slight that no repairs are required, nor for raked or cornered sheathing, roofing, fascia, or bent or cornered end sills, *not necessitating* the shopping of the car *before reloading,* the receiving line to be the judge.

RULE 43.

The committee recommends that the following note be added to rule 43:

NOTE—In the case of damage to more than five longitudinal sills on wooden underframe cars, more than four longitudinal sills on composite wooden and steel underframe cars, more than three steel longitudinal sills on steel or steel underframe cars and both steel center members on tank cars with two steel longitudinal sills only, the company on whose line such damage occurred must furnish owner statement showing the circumstances under which the damage occurred, if it is claimed that the damage was the result of ordinary handling. This statement, in the case of cars reported under Rule 120, to accompany request for disposition of car, and in cases where it is not necessary to report car under Rule 120 to accompany the bill for repairs.

The committee recommends that, in view of the foregoing note, the first interpretation of Rule 43 shown at the top of page 54 of the 1919 Rules of Interchange, be eliminated.

RULE 66.

The committee recommends that Section (a) of Rule 66, be modified in accordance with the proposed form shown below:

PROPOSED FORM.—Rule 66, section (a). All journal boxes shall be repacked with properly prepared packing (new or renovated) at least once every twelve months, at which time all packing will be removed from the boxes and the boxes cleaned; dust guards to be renewed (*if necessary*) *or replaced,* when wheels are changed.

RULE 86.

The committee recommends that Section (a) of Rule 86, be modified in accordance with the proposed form shown below. The present form of the first paragraphs of this section, in which the principal changes occur, is shown also.

PRESENT FORM.—Rule 86 (a).

FOR CARS WITH NON-A. R. A. STANDARD AXLES (FOUR AXLES PER CAR).

(a) Non-A. R. A. Standard axles less than the following prescribed limits must be removed from service:

Capacity, lb.	Journal, in.	Wheel seat, in.	Axle center, in.
70,000	4	5⅝	4⅞
60,000	3¾	5	4⅜
50,000	3½	4¾	4⅛
40,000	3¼	4⅝	3⅞

NOTE—Axles heretofore known as 70,000 lb. and 50,000 lb. capacity axles are not A. R. A. Standard axles.

PROPOSED FORM.—Rule 86 (a).

FOR CARS WITH NON-A. R. A. STANDARD AXLES (FOUR AXLES PER CAR).

(a) Non-A. R. A. Standard axles less than the prescribed limit of wear shown in Table No. 1, must be removed from service.

Until such non-A. R. A. Standard axles are removed from service, they may be used for total permissible weight of car and its lading on rail, as shown under Column "A."

TABLE No. 1

A Total Permissible Weight of Car and Lading on Rail Lb.	B Normal Capacity Lb.	C Journal Diameter Worn Limit In.	D Wheel Seat Diameter Worn Limit In.	E Center Diameter Worn Limit In.
148,000	100,000	5	6 7/8	5 5/8
105,000	70,000	4	5 5/8	4 7/8
78,000	60,000	3 3/4	5	4 3/8
66,000	50,000	3 1/2	4 3/4	4 1/8
56,000	40,000	3 1/4	4 5/8	3 7/8

FOR CARS WITH A. R. A. STANDARD AXLES (FOUR AXLES PER CAR).

The total weight of car and its lading on rail must not exceed weight given in Column "A." Column "B" is the nominal capacity *heretofore* stenciled on cars. Axles must be removed from service when less than the prescribed limits in Columns "C," "D," "E," or when the condemning limits in Columns "F" and "H" are reached.

All cars to have their light weight and capacity in pounds stenciled on them as per *Rule 30.*

The committee recommends that the second paragraph of Section (e) of Rule 86, reading as follows, be eliminated:

See paragraph (c), Rule 2.—Cars of 80,000-lb. capacity and over, equipped with A. R. A. Standard axles, may be loaded to maximum shown in Column "A," which is the total weight of car and lading for the respective capacities given.

RULE 91.

The committee recommends that Section (f) of Rule 91, be modified in accordance with the form shown below:

PROPOSED FORM.—Rule 91, section (f). All bills should be rendered promptly. Bills rendered after one year from date of repairs may be declined. *No bill should be rendered for repairs to cars after the time limit has expired, even though previous attempts have been made to ascertain proper ownership.*

RULE 92.

The committee recommends that Rule 92 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 92. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear, except that bills for repairs to leased cars or cars of other ownership shall be rendered direct if so directed in the billing instructions in The Official Railway Equipment Register.

PROPOSED FORM.—Rule 92. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear.

RULE 93.

The committee recommends that Rule 93 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 93. Separate bills must be rendered for cars destroyed.

All charges for repairs made to cars on account of owner's defects, defect cards and rebuttal authorities must be consolidated against any one company into one bill, except that a separate bill shall be made for the period prior to January 1, 1918.

Separate statements to be made:

First. For owner's defects for each calendar month.

Second. For all charges based on defect cards, including rebuttal charges.

NOTE—Totals only of these statements to be shown on the recapitulation.

The title and address of officer to whom correspondence should be forwarded relative to exceptions to charges should appear on the bill.

PROPOSED FORM.—Rule 93. Separate bills *shall* be rendered for cars destroyed.

Separate bills shall be rendered for the periodical repacking of journal boxes.

All charges for repairs made to cars on account of owner's defects, defect card and rebuttal authorities *shall* be consolidated against any one company into one bill, *however,* separate bill shall be *rendered* for the period *subsequent to February 29, 1920.*

Separate statements to be made:

First. For owner's defects for each calendar month.

Second. For all charges based on defect cards, including rebuttal charges.

NOTE—Totals only of these statements to be shown on the recapitulation.

The title and address of officer to whom correspondence should be forwarded relative to exceptions to charges should appear on the bill.

RULE 108.

The committee recommends that Rule 108 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 108. No labor to be charged for the inspection of cars, testing or adjusting brakes, adjusting angle cocks, tightening unions or spreading cotters; sill steps, ladder treads or handholds, tightening or straightening on car.

No material or labor to be charged for the following items of repairs:

(1) Air-hose gaskets, applied, except with hose complete, applied.
(2) Brake pins or key bolts, applied.
(3) Brake ratchet wheel keys, applied.
(4) Brake shaft-rings, applied.
(5) Brake-shoe keys, applied.
(6) Carrier iron, Bettendorf type, when turned over, no charge for adjustment.
(7) Coupler release clevises, clevis links or chains, clevis pins or bolts, applied.
(8) Lag screws, applied, except when used to complete other items of repairs not herein listed.
(9) Nuts or lag screws, tightened.
(10) Nuts, 3/4 in. or less, applied, except when used in renewal of bolts.
(11) Nut locks, or lock nuts, applied.
(12) Release-valve rods, repaired or applied.
(13) Straightening brake shafts and uncoupling levers when not removed from car.
(14) Spring cotters and split keys, applied.
(15) Staples, applied.
(16) Wood screws, applied, except when used in renewal of running board.
(17) Washers, applied, except when used in renewal of bolts.

No charge to be made for the material or labor of lubrication, except as provided in Rule 66.

PROPOSED FORM.—Rule 108. No labor to be charged for the inspection of cars, testing or adjusting brakes, adjusting angle cocks, tightening unions, *nuts or lag screws* or spreading cotters; sill steps, ladder treads or handholds, tightening or straightening on car; *brake shafts or uncoupling levers straightened when not removed from car.*

No charge to be made for the material or labor of lubrication, except as provided in Rule 66.

Passenger Car Rules

RULE 2.

The committee recommends that the following be added to Rule 2 as Section (b):

Cars, loaded or empty, using lighting outfits, operated by gasoline engines, will not be accepted in interchange.

RULE 21.

The committee recommends that the first paragraph of this rule, relative to labor charge for cleaning, oiling, testing and stenciling ordinary quick-action triple valves, and for cleaning, oiling and stenciling brake cylinders 14 in. or less in diameter, be eliminated, and that the price formerly shown in Rule 111 of the Freight Car Code, for separate charges for triple valves and cylinders, be added to this rule with the same percentage of increase as recommended by the Committee on Prices for Labor and Material to Freight Car Rule 111.

The report is signed by T. H. Goodnow (chairman), Chicago & North Western; J. J. Hennessy, Chicago, Milwaukee & St. Paul; J. Coleman, Grand Trunk; F. W. Brazier, New York Central; P. F. Smith, Jr., Pennsylvania System; J. E. O'Brien, Missouri Pacific and G. F. Laughlin, Armour Car Lines.

Discussion

The report of the committee was presented by T. H. Goodnow (C. & N. W.), chairman, who said: The committee felt, with the return of the railroads to private ownership, that the fewer changes made in the rules this year the better, on account of the number of comparisons being made. The committee does not desire to be misunderstood by this as discouraging the submitting of recommendations or suggestions for changes in the rules. It has been the practice in the past to mention all suggestions which were made, but the committee feels that hereafter it should report on only those suggestions which were concurred in and adopted. The changes in the rules are of minor importance, but the more important have to do with changing the capacity stenciling on cars, also the rules in connection with that branch of the subject.

Since the report was printed the committee has received a request from the Industrial Car Manufacturers' Institute for a rule which will permit the handling of export cars, or industrial cars not fully complying with the A. R. A. requirements. At a meeting of the Arbitration Committee, held yesterday afternon, the following action was taken, and is now offered as a part of this report:

Industrial or other cars not intended for interchange service, when empty and moving on their own wheels, may be accepted in interchange in their initial movement from manufacturer to destination (or seaboard) without meeting the requirements of Section *A*, insofar as the retaining valve and A. R. A. standard triple valve is concerned, second paragraph of Section *C* for No. 2, A. R. A. brake beams, Sections *H, M* and *O* and specifications for Tank Cars. To each side of such cars a card shall be attached by shippers, reading as follows:

Industrial or Export Car
shipped in accordance with
A. R. A. Rule 3.
Signed.....
Shipper.

I wish to call attention to Rule 32. There is an error in printing Section (d)—the two commas following "collision" and "switching" should be omitted, which, I think, will clarify the rule. The committee, on account of the non-A. R. A., standard axles, 5¼ in. by 9 in., and 4½ in. by 7 in., has considered it advisable to recommend a change which will allow a second-hand credit rather than a scrap credit for these axles, where they can be turned to 5 in. by 9 in., or 4¼ in. by 7 in., without any other work in connection with the axles. This matter is offered as follows, to be included as part of the report: "Your committee suggests that present Rule 98 be revised to provide that the non-standard 100,000-lb. capacity axle which has 5¼ in. by 9 in. journals and the 70,000-lb. capacity axle which has 4½ in. by 8 in. journals, the over-all length conforming to A. R. A. standards for 80,000 and 60,000-lb. axles respectively, when removed from service and replaced with A. R. A. standard axles, shall be credited at second-hand values for A. R. A. standard 80,000-lb. and 60,000-lb. axles respectively, provided such axles can be turned to the required dimensions for the second-hand axles mentioned." It is felt that such axles should not be credited as scrap inasmuch as they can be reclaimed for use as A. R. A. standard axles.

C. E. Fuller (U. P.): *I move that the report be accepted and adopted as read.*

Mr. Goodnow: I find I have omitted one change. In connection with the charge for periodic repacking of freight equipment the committee would recommend the following:

"To justify bill, the repacking must be done in accordance with A. R. A. Recommended Practice." The above to be a new sentence to first paragraph of Rule 66.

G. F. Laughlin (Armour Car Lines): I do not see it in the committee's report, but it is my understanding in the adoption of the report of the Committee on Prices, the percentage now included in Rule 160 be eliminated.

Mr. Goodnow: I would rather have Mr. Carson, the chairman of the Committee on Prices, answer that question, but it is my understanding that the revision of the prices both for labor and material, eliminate the perecentage which has been added heretofore in the prices.

The motion to accept and adopt the report was carried.

J. H. Milton (C. R. I. & P.): I want to ask if it can be arranged that the prices on materials should be made effective as early as possible, as I feel that all the railroads are very deeply interested in getting that rule into effect.

C. E. Chambers (C. of N. J.): On behalf of the Committee on Resolutions, I wish to make the following report: The Committee on Prices for Labor and Material have been at work constantly for three or four years trying to revise the prices and keep even with the upward tendency. The committee offers the following:

RESOLVED: That the report of the Committee on Prices for Labor and Material be made effective at as early a date as the necessary circulars can be issued and gotten out to the members.

RESOLVED: That the use of salt with ice for refrigeration be prohibited in all cars not equipped with brine tanks, except those carrying meat, dressed poultry, game, fresh fish, sea foods and eggs.

A motion to adopt both resolutions was duly seconded and carried.

Report of the Committee on Tank Cars

THE WORK OF THE TANK CAR COMMITTEE during the past year has been largely devoted to details of construction calling for improvement, most of which have been referred to in previous reports. As these details have not yet been settled in a manner satisfactory to the committee, this report is principally one of progress.

Safety Valves—The safety valve in various modified forms has been subjected to an extensive series of steam tests at Altoona.

The first requirement of a tank car safety valve, of course, is that it shall adequately relieve internal pressure. The necessity for this is emphasized by the reports of the behavior of numerous tanks which have been involved in wrecks accompanied by fire. In these cases, nothwithstanding the high bursting strength which it is required the tanks shall be calculated to meet, many tanks when weakened by the high fire temperature have stretched, and some have burst. Therefore, no valve of a capacity less than the standard can be considered. So far none of the modified valves tested has shown a capacity equal to that of the standard design.

The greatest difficulty appears to be in securing complete tightness up to the popping pressure. All of the tests indicate that leakage begins below that pressure, in some cases very materially below. With the old straight refinery gasolines this was not a matter of prime importance because of the low vapor tension of the product. The situation is very different today with the products, either straight or blended, derived from natural gas. Some of these very volatile products have a vapor tension as high as 20 lb. at 100° F., and it is important to prevent the escape of the vapor, not only from the standpoint of conservation of the product, but because of the dangers arising from the escaping vapor.

In addition to stock valves of the standard form, the tests included one valve which was accurately machined to the standard dimensions throughout, and others with special non-corrosive seats. Special springs of a better quality and more carefully made than the ordinary springs were obtained and tested in connection with the different valves. It has not been possible, however, to

secure complete tightness, indicating that the difficulty is not altogether one of workmanship but includes, as well, that of design.

To widen the field as much as possible, the problem has been taken up with several manufacturers of locomotive safety valves who have been encouraged to submit their own designs, the only restriction being that such valves shall have a discharge capacity at least equal to that of the standard valve and that they shall be interchangeable with the standard valve so far as the fitting on the dome is concerned. Three concerns have been working on the problem and two of them have submitted valves. Tests of these valves developed shortcomings and they have been returned to the makers for modifications with a view to overcoming the difficulties, after which further tests will be made.

Tolerance in Capacity of Tank Taking One Safety Valve—Section 20, Safety Valves, of the specifications, requires that

> (b) One valve shall be provided for a tank of a capacity of 6,500 gallons or less, and two valves for a tank of a capacity of more than 6,500 gallons.

It appears that in some cases tanks of a nominal capacity of 6,500 gallons exceed that capacity slightly because of variations in construction, and the committee recommends that Section 20 be amended to read as follows, to permit a tolerance to cover this condition:

> (b) One valve shall be provided for a tank of a capacity of 6,500 gallons or less, with a tolerance of not over 150 gallons to take care of variations due to workmanship in construction, and two valves for a tank of a capacity of more than 6,500 gallons plus the tolerance.

Safety Valve Adjustment When Tested—To make it clear that it is not necessary to adjust a safety valve which when tested opens between the prescribed minimum and maximum scale readings, the committee recommends that the first paragraph of Section 24, Tests of Safety Valves, in each of the specifications, be amended to read:

> "Safety valves shall be tested, and if necessary adjusted, at intervals of not over two years (or whatever period is shown), those on new cars to be tested and adjusted before the cars are placed in service."

Safety Valve, 1916 Design—The committee recommends that Circular S-III—90, Application of Washer and Jam Nuts to Valve Stem, be included in the Tank Car Specifications.

Bottom Outlet Valve—The reports of the Bureau of Explosives continue to emphasize the shortcomings of the existing bottom outlet valves. After discussion of the subject at a meeting of the committee at which were present representatives of the Bureau of Explosives and members of the newly organized American Petroleum Institute, a sub-committee, consisting of A. G. Trumbull (chairman), Erie; John Purcell, Atchison, Topeka & Santa Fe, and J. E. Grant, Bureau of Explosives, was appointed to investigate the whole subject.

This sub-committee examined all designs of bottom outlet valves that had been submitted by the inventors, and also secured and examined the designs used by the principal tank car builders, and all patents covering bottom outlet valves. Its report, which is attached as an appendix, outlines certain features desirable in the bottom outlet valve. The Tank Car Committee recommends that these features be stated in the Tank Car Specifications, not as requirements, but as a general guide in designing a valve.

It is realized that the inclusion in one valve of all the features described is hardly to be hoped for immediately, but compliance with a majority of them will be an improvement on the valves now available.

The American Petroleum Institute, through its Technical Committee, is co-operating in the effort to secure a better valve, and has agreed to have its members make actual trials of any valves which promise satisfactory results.

Bottom Outlet Pipe—A prominent feature of the reports of accidents involving tank cars is the unseating of the valve by breaking of the bottom outlet pipe from being struck by derailment of the car or excessive shifting of the tank. This frequently results in the loss of the entire contents of the tank, which in many cases are ignited by friction sparks. The outlet pipe projects below the sills for the attachment of the unloading connection and is consequently very vulnerable. The specifications have, for a long time, required a groove in the casting to insure that when struck in case of accident the break will occur at a point which will not involve the valve. There has not been any requirement as to the depth of the groove, and, in many cases it has been found that the depth was not sufficient to locate the break as intended. A service condition that has to be met is that, after the tank is loaded, the cap is screwed home with a long wrench, sometimes with the aid of a sledge. The committee has made experiments to determine the thickness of metal necessary at the bottom of the groove to give sufficient strength to meet service conditions and at the same time locate the break in case of accident, and recommends that the first paragraph of Section 7, Bottom Outlet Valve, be amended to read:

> The outlet valve casting shall be so designed that breakage will not unseat the valve, the preferable construction being to cut (not cast) a "V" groove in the upper part of the casting at a point immediately below any part of the valve, to a depth that will leave the thickness of the casting at the root of the "V" not over ⅛ in. (See Fig. 2.)

Dome Closing Arrangement—With the screwed dome cover which is in general use there is danger from its being prematurely released by defective threads, or insufficient length of threads, and also of its being removed through stupidity before the pressure in the tank has been relieved. There is also leakage due to worn threads and defective gaskets.

Designs of covers of the bolted type and of the boiler manhole type have been submitted to the committee and approved for experimental use. At least one of these designs has been in service for about four years with reported satisfactory results. Both types have the advantage that they can not be removed until the internal pressure has been relieved.

The American Petroleum Institute is co-operating with the committee in the endeavor to improve this feature, and the committee expects to make definite recommendations later.

Heater Pipes.—In view of the diversity of the methods of application of heater pipes at present and of the products carried in cars so equipped, a sub-committee has been appointed, representing the different interests, to investigate the whole subject. After this has been done the committee will make such recommendations as the situation may call for.

Openings in Heads of Tanks.—Where heater pipes are used it is frequently the practice to make an opening in one head of the tank for handling the pipes in and out. This opening, as a rule, is closed by a plug screwed through the sheet or through a flanged fitting. There have been a number of failures of these plugs involving, in addition to loss of contents of the tank, injury and loss of life. In all cases it developed that the failure was due to the use of a cast plug cored on the inside for lightness.

The committee recommends that the specifications require that where plugs are used in the heads of tanks of new tank cars, or as replacements in the case of existing cars, they shall be solid, of a good grade of gray cast iron, standard pipe thread and taper, and of a length which will screw at least six threads inside the face of fitting or tank.

Quality of Steel Plates for Tanks—In 1916, after full discussion in which representatives of the tank car builders and owners took part, the Tank Car Committee recommended and the Association adopted the requirement that for tank cars built after May 1, 1917:

> All plates for tank and dome shall be of steel complying with the American Society for Testing Materials Specifications for Boiler Plate Steel, Flange Quality.

Before this requirement became effective the demand for steel for war purposes made it desirable to postpone its enforcement in the case of the Class III, or general service car, for the duration of the war. Because of the unsettled condition due to the strike in the steel industry the effective date has been further extended several times, the last extension being to May 31, 1920, to permit the completion of cars under construction or for which material on order had been delayed in delivery.

In the meantime, while certain purchasers of tank cars have insisted upon A. S. T. M. boiler plate steel flange quality, most of the tank car builders have been making tanks of tank quality steel. Tank steel is not subject to any specification; it may include good metal, but there is no assurance of that fact. The principal difficulty in securing an adequate supply of the quality steel called for by the Tank Car Specifications is the objection of the steel companies to the curtailment of their output by the amount of testing necessary, one set of physical tests being required for each plate as rolled. The steel people claim that this calls for so many tests that, with their present practice, they have not room to store the plates awaiting test. It has not been shown that this is an insuperable difficulty.

Anchorage Bolts—In view of cases of shifting of the tank due to loss of anchorage bolts because they were inserted from the bottom and dropped out when the nuts were lost, the committee recommends adding to the fifth paragraph of Section 13, Anchorage, in specifications for Classes III, IV and V cars, a sentence reading:

> When, because of the construction, bolts can not be inserted from the top so that the nuts will be on the bottom, nut locks shall be applied to both bolts and nuts, or rivets shall be used.

The report was signed by A. W. Gibbs (Chairman), Pennsylvania; C. E. Chambers, Central of New Jersey; Wm. Schlafge, Erie; S. Lynn, Pittsburgh & Lake Erie; Jno. Purcell, Atchison, Topeka & Santa Fe; Geo. McCormick, Southern Pacific; A. E. Smith, Union Tank Line; Geo. Hartley, Semet-Solvay Company, and C. W. Owsley, The Texas Company.

Appendix A—Report of Sub-Committee on Design of Bottom Outlet Valve

In view of the fact that the subject of the design of the bottom outlet valve for tank cars is of such present interest and the problem is being considered by many interested parties, including the American Petroleum Institute, it seemed desirable that an outline specification should be prepared as a guide for the development of the ideal bottom outlet valve, and the sub-committee submits the following:

1. The valve seat should be independent of the outlet chamber, so that if the outlet-chamber flange is accidentally torn off the tank, the contents of the tank will not escape.
2. The construction should be such that the tank may be completely emptied through the valve.
3. In order that the valve may not lift from its seat in the event of an accident separating the discharge chamber from the shell, the valve should have no wings or stem projecting below the bottom of the tank.
4. The valve must remain seated under vapor and liquor pressure within the tank.
5. The valve chamber or valve should not distort because of the changing contour of the shell due to lading, expansion or other usual causes.
6. The valve should not tighten on its seat under the vibratory action of the stem.
7. The design should be such as not to create a tendency to lock or wedge the valve on its seat.
8. It should not be possible to displace the valve on its seat because of the movement of the car, vibration of the tank or the effect of the movement of the liquid contents of the tank.
9. The design should not permit side-lifting of the valve because of uneven spring tension.
10. The design should not permit displacement of the valve through pressure from below.
11. The valve should operate from the interior of the tank, but in the event the rod is carried through the dome, leaking shall be prevented by packing in stuffing box and cap nut.
12. The valve operating gear must have means of compensating for variations in the vertical diameter of the tank produced by expansion, weight of the liquid contents, or other usual causes.
13. The valve and seat should be so designed as to permit expansion of freezing liquids.
14. The valve and seat should be readily removable for repairs, including grinding.
15. It is desirable that the design of valve operating mechanism shall be such that the dome cover can not be applied until the valve is closed.

In its deliberations the sub-committee has recognized the fact that great opposition to the elimination of the bottom outlet would doubtless be encountered at the present time, and the report, therefore, contemplates the perpetuation of this feature of tank car construction; but it is rcognized that it will be decidedly preferable to adopt other means of discharging tank cars, thereby avoiding all risks which can not be eliminated as long as the bottom outlet is maintained.

Discussion

The report of the committee was presented by A. W. Gibbs (Penn.), who said: The work of the Tank Car Committee during the past year has been largely devoted to details of construction calling for improvements, most of which have been referred to in a previous report. As these details have not been settled in a manner satisfactory to the committee, the report is principally one of progress. Additional tests have been made at Altoona of safety valves of the standard design, modified in certain respects; also of valves designed by certain manufacturers of locomotive safety valves, who are endeavoring to produce a valve which will satisfactorily meet tank car requirements. Two of these latter valves have since been modified and are now at Altoona for further test, together with a valve submitted by a third concern, which will be tested at the same time. The bottom outlet valve is still the most difficult subject to deal with. If any of you will take the time and trouble to read the report of the Bureau of Explosives, you will see that derailments are quite frequent, and you will see that they result in the loss of the contents of the car from breaking the outlet pipe.

We have had offers of co-operation from two organizations, the American Petroleum Institute and the National Petroleum Association. So far we have not accomplished much, but we have their promise to try any devices which seem sufficiently promising to effect an improvement. To assist in that the committee has framed an appendix, containing some recommendations of the conditions which will be met by a successful valve. In a great many cases of derailment, the extension of the bottom pipe is broken off, and in many cases it has dislodged the valve, resulting in some very extensive fires. Therefore, the committee determined that the present requirement that the pipe should be nicked below the valve, should be more specifically covered. A number of independent examinations have been made on this subject, and all of them have closely agreed as to the thickness of the pipe, which should remain at the bottom of the groove. The thickest was 3/8 in. and the others were 5/16 in., and therefore the committee wishes to have that defined in the drawing.

To show how little some of the car owners appreciate the importance of this subject, I will say that a number of cars have been reported in which nipples and supplementary valves have been applied extending a very considerable distance below the seals, and the explanation given by these people is that the valves are so bad that the consignors are afraid to take the caps off for fear that the contents will run out, so they transfer the burden of the thing to us. These cars are a continual invitation to trouble, and the trouble that the consignee fears we get. Therefore, that matter will be covered in a subsequent recommendation.

In the dome closing arrangement there are improvements over the present screw-threaded arrangment on file, and it is hoped that eventually something better can be specified. We are not ready to do that. The same holds true in regard to heated pipes, which are complicated more or less by patent conditions, and we are not sure that any is so much better than another as to justify a recommendation at present.

The most important thing, aside from the bottom discharge valve, is the quality of the steel plate for cars. During the war, you will remember that owing to the shortage of steel we had to waive the requirement for boiler flange steel for the tanks, and that extended to a period after the war. Some manufacturers have a considerable amount of tank steel on hand, and the committee is convinced that that is an unsatisfactory material. It is not a specification material at all, as there is no specification for tanks. We made this recommendation and had a further hearing yesterday afternoon, at which the tank car people were represented. The burden of their claim was that they had difficulty in getting flange steel because the requirement is that each slab as rolled shall be tested. Some of the manufacturers wished to substitute structural steel for cars, which calls for one or two tests per mill, but in no way safeguards the buyer against insufficient discard in the cutting of the slab.

The manufacturers' principal objection is the amount of testing required, but after hearing all sides, the committee feels that it should not again extend the time for the use of other than flange steel. This should apply to all. Some manufacturers have been very fair in ordering flange steel in advance and making cars of it; some others have loaded up with tank steel far beyond any possibility of delivery wtihin the time specified, and to extend further is to put a penalty on the people who have tried to meet our views. Therefore, the committee recommends, as an addition to the report, that the requirements for boiler flange steel as specified by the American Society for Testing Materials, as per extension expiring June 1, 1920, shall be made effective at that date. As regards nipples and valves, of which some have been applied, your committee considers that it is a direct invitation to trouble in case of derailment, and would add to the report a requirement that cars so fitted shall not be accepted in interchange.

F. W. Brazier (N. Y. C.): I move that we accept the committee's report and also that a vote of thanks be extended to Mr. Gibbs for the work he has done on this committee in the years past. My motion also carries with it the recommendation

that such changes may be approved. I make a motion that the committee's report be accepted and their recommendations on pages 3 and 5 be adopted.

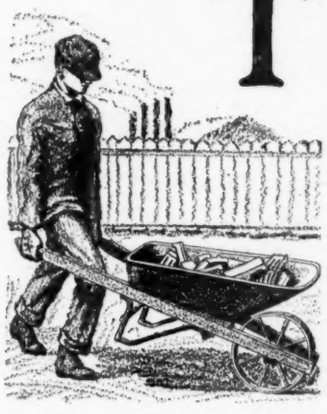
T. H. Goodnow (C. & N. W.): I second the motion.

Geo. Hartley (Semet Solvey Co.): The Tank Car Committee, I think, has done a good thing, and I hope that this matter of boiler flange steel will be accepted. The committee has endeavored to make the tank good under the accepted formula with reference to strength of cylinders, lateral strength of seams and the material that goes into the cylinder, and unless we have a well-flanged steel, with good tensile strength and worked upon the foundation or base, all formulas with reference to the strength of cylinders and otherwise are useless. The only way we can actually get good material to do good work on the rest of the cylinder is to get a flange steel, and we fail to see why people won't take that into consideration, particularly the tank car owners. That we should be given a steel that we don't know anything about to put in a tank car loaded with casing-head gasoline or benzol or gasoline and have that become cracked along the road and distribute its contents to become ignited by some passing engine, seems absurd. We must have boiler flange steel.

Mr. Gibbs: I think that we are making some of our own trouble. We recently had a complaint from one of the large shippers, asking us to remove one of our inspectors because he insisted on the cars being loaded with the cap off, and that made us wonder what other people were doing. It that man was so unreasonable, are the other inspectors so unreasonable, and if so, why aren't they complained of' It was an eye-opener to me to have a request of that kind, and I suspect that if we were ourselves on the receiving tracks, insisting that we see the car before the cap is on, we might save very much of this trouble.

The motion that the committee's report be received and a vote of thanks be extended to Mr. Gibbs was unanimously adopted.

Report on Brake Shoe and Brake Beam Equipment



THIS COMMITTEE HAS PURSUED the lines of investigation and study suggested in its report of last year.

The No. 2 brake beam capacity question remains somewhat involved, at least there is evident lack of agreement among the members on the question of whether or not the capacity of such beams should be increased from 12,000 lb., the figure at which it has stood for years, to 15,000 lb., as per the 1918 Standard.

On account of the general situation, the committee agreed upon the advisability of the following inquiry to representative members on this capacity question:

"Per the Brake Shoe and Brake Beam Equipment Committee's report of last year, by letter ballot of 1917, the No. 2 brake beam shown on sheet *R* of that year had been adopted as recommended practice, by close margin.

"The required capacity of this beam remained at 12,000 lb. As a result of Executive Committee action taken in New York City, October 11, 1918, there appeared in 1918, upon M. C. B. Sheet 17-B, a 'No. 2 standard brake beam with details' specifying definitely 1¼-in. tension member and in the specification an increase in the 'capacity' of the No. 2 beam from 12,000 to 15,000 lb. It appears that without further action No. 2 brake beam capacity stands at 15,000 lb., and the size of the tension member definitely at 1¼ in.

"Regardless of this situation, the committee desires the benefit of your reply to the following questions:

"(A) Whether or not you are of the opinion that present service requires a '15,000-lb. beam'; (B) whether abolition of the '12,000-lb. beam' is required or desirable; (C) if a '15-000-lb. beam' is desirable, for what weights of cars should it be required; (D) if the abolition of the '12,000-lb.' beam' is desirable, from what weights of cars should its use be barred, and as of what date would you suggest that the use thereof should be eliminated or restricted; (E) could or should '12,000-lb. beams' and '15,000-lb. beams' be applied and accepted indiscriminately, or should '15,000-lb. beams' be used to replace '12,000-lb. beams' on cars exceeding a specified weight, or should '15,00-lb. beams' be used on all cars; (F) if 15,000-lb. beam is adjudged desirable or required, should it be known as a 'No. 2 Beam' or as a 'No. 2½ Beam,' as has been suggested, in order to differentiate between the higher capacity 15,000-lb. beams and the large quantity of 12,000-lb. No. 2 beams already in service; (G) if, in your judgment, the No. 2 brake beam capacity question should be opened, on what grounds would you suggest the matter be opened?"

From replies received thereto, the committee is well supported in recommending that, by appropriate letter ballot action, there should be recognized in the standards "12,000-lb. beams" and "15,000-lb. beams." That is, that the "12,000-lb. beams" should not be eliminated from the standards.

It has been suggested that the capacity of brake beams be increased for the purpose of lowering the cost of beam maintenance and increasing the efficiency of brake beam service. The committee questions the expediency of brake beam capacity increase on these grounds, and, in view of its study of brake beam failures and maintenance practice, is of the opinion that unsatisfactory brake beam service and cost of maintenance are chargeable to brake beam failures in which strength is not a factor, to brake beam design cramped because of limiting truck conditions imposed, to unfair brake beam treatment represented in the interchange of beams which are not interchangeable, and to general practices obtaining with regard to the repair of beams. The committee is of the opinion that present 12,000-lb. beams are not failing on any accounts which either prescription of 1¼-in. tension members or increase in required capacity from 12,000 to 15,000 lb. will correct.

In last year's report the committee suggested the possibility of its recommending this year the re-establishment of the 12,000-lb. beam to be known as heretofore as "No. 2 Beam" and the recognition of the 15,000-lb. capacity beam to be known as "No. 2½ Beam." The committee suggests that if this general plan of covering the situation is pursued, the 2½-in. be replaced by "2X," for the reason that the suggested "2X" designation will serve all purposes and will be susceptible of more clear designation in casting. The Committee on Car Construction is apparently in accord with the idea that both 12,000-lb. and 15,000-lb. beams ought to be represented in the standards, and has given attention to the matter of marking. It is, therefore, the consensus of this committee's opinion that the question of beam markings should be covered by an appropriately arranged letter ballot question which will embrace simultaneously the suggestions of this committee and those of the Car Construction Committee in this particular.

It is the opinion of this committee that "No. 2" should be preserved as the designation applying to the 12,000-lb. beams on the grounds that, because of being placed in a position of either changing the designation on the very large quantity of 12,000-lb. beams now in use, or of changing the designation on the comparatively few 15,000-lb. beams now in use bearing this same designation, it would be better to change such designation as applied to the smaller number of such 15,000-lb. beams involved.

On account of the comparatively few No. 3, 4, 5 and 6 beams now in service, it has, and with reason, been suggested that the new 15,000-lb. beam be introduced as No. 3 and the numbers applying to the higher capacity beams be moved up to make room for this insertion.

The committee suggests the need of some attention to revising interchange rules on this matter of beam capacity. These have required, for some time, that "The No. 1 beam (6,500 lb. capacity) must not be used on cars having a light weight in excess of 35,000 lb." Although many cars of weight exceeding this limit are operating with beams which would classify as No. 1 or less, the committee appreciates the developing necessity

of there being determined a maximum weight of car from which the use of a 12,000-lb. beam should probably be barred, and in this connection suggests the consideration of a rule to the effect that the combined capacity of the beams carried by a car should not be less than the light weight thereof. The committee does not assume to make specific recommendations on this matter because the Car Construction Committee has had it under consideration.

Such a rule would cover nearly 100 per cent braking power, would permit the use of the No. 1 beam only on cars of less than 26,000 lb. light weight, of which cars there are of course very few, and would permit the use of 12,000-lb. beams upon cars weighing light not in excess of 48,000 lb., or almost up to the light weight of recently constructed 70-ton cars, and would prescribe the use of a 15,000-lb. capacity beam upon cars weighing light from 48,000 to 60,000 lb. The equity of such an arrangement is apparent so long as established practices regarding the percentages of braking power remain undisturbed.

In connection with this matter of interchanging "non-interchangeable" beams, and with the necessity of beginning

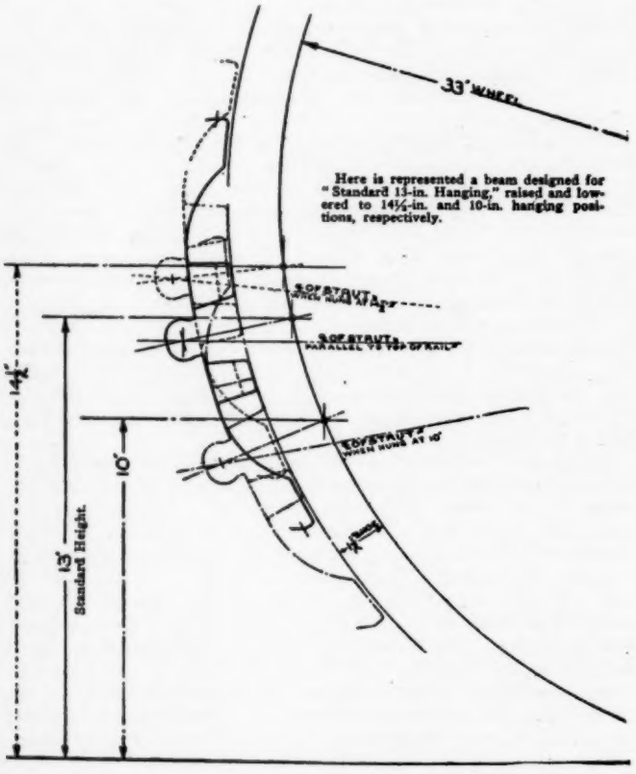

33" WHEEL
Here is represented a beam designed for "Standard 13-in. Hanging," raised and lowered to 14½-in. and 10-in. hanging positions, respectively.
14½"
13"
Standard Height.
10"

Fig. 1.—Effect of Improper Hanging on Stresses in Beam

at the bottom of brake beam design, as indicated in the committee's last year's report, Fig. 1 is submitted. This figure is intended to present the punishment imposed upon beams which are hung at other than that height of hanging in which the line of strut remains in the plane parallel to the top of the rail, that is, of the normal line of pull. It appears unreasonable to expect beams to withstand successfully the transverse stresses imposed by the application of loads in directions other than those of the strut center line or what may properly be termed the "plane of the beam."

In order to get beams hung at proper heights by repairmen, it will be necessary to arrange means by which such men can readily determine, from a ready and prompt inspection, the heights for which beams are designed. This committee is undertaking to arrange a gage with which these hanging heights may be so determined.

The maintenance practices obtaining with regard to brake beam repairs already referred to are, in the judgment of the committee, very important factors in brake beam maintenance costs and their service efficiencies.

In the large, brake beam repairing facilities and practices are surprisingly crude and comparison can hardly be made between the beams delivered by manufacturers under A. R. A. specifications and those turned out repaired or manufactured at the carriers' plants. With the former, the No. 2 beams, for example, have been required to withstand 12,000 lb. load with a maximum deflection of .07 in., then a set load of 24,000 lb. with which the permanent set shall not exceed .01 in., and a further movement of the testing machine head of 2 in. without breakage of any beam parts.

Carriers' practices and facilities which have been witnessed do not provide for or include any such tests and, from the crude practices and conditions observed, the committee may very fairly state that practically none of the carriers' overhauled beams are fit for subjection to any such tests as are imposed by the specifications under which new beams are purchased. At an important repair point on one line, one repaired No. 2 beam of a lot of six, tested to the required 12,000 lb. capacity tests; others took at 1/16 in. deflection only 9,000, 8,580, 7,580, 10,550 and 9,960 lb., respectively.

It will be appreciated that repaired beams go into exactly the same service as new beams and it may, therefore, be reasonably expected that under present conditions beams once repaired become repeatedly candidates for further repair. The committee is of the opinion that the percentage of brake beam failures in fair service which might be allocated to repaired beams would be found to be surprisingly great.

The carriers' interchange of "non-interchangeable" beams has been referred to, along with which reference should be made to interchange of hangers or the continued use of hangers which will give the beam other than the designed hanging conditions. Not infrequently a difference in hanging conditions is found to obtain on opposite ends of the same beam.

The committee volunteers to make this question of beam maintenance conditions, facilities and practices the subject of particular study during the coming year and hopes to be able, in its next report, to make definite recommendations including a code of standards which should be met in brake beam repair work.

The committee has made a careful study of the information obtained through the medium of the questionnaire, accompanied by the diagram and table of desired brake beam limiting condition information, represented in Fig. 1 of last year's report. Fig. 2, showing graphically a small portion of the information obtained, indicates clearly the necessity of providing in the Standards some more shallow depth brake heads than represented in 1918 Sheet 17-B because on large quantities of existing cars, which will be in service for a long time, there is not the room required for its use, that is, it can not be applied. This is perhaps more pointedly indicated by Fig. 3.

Having analyzed the situation, the committee submits as its recommended solution of the brake head depth question the adoption by letter ballot of the three depths of heads exhibited as types *A*, *B* and *C* of Fig. No. 4 herewith.

Type *A* is of the center hung variety the same, so far as concerns depth, as shown on Sheet 17-B of 1918 and represents the maximum condition acceptable within the clearance diagram.

Type *B* meets an intermediate condition which will not admit the use of the center stirrup hanger.

Type *C* is arranged for those conditions which will not permit the use of either types *A* or *B* but will permit of good stable construction where the restricted head depth represented is absolutely required.

These head depths take care of practically all of the prevailing conditions on equipment now offered in interchange. There will, however, be some conditions to be met that will not allow the use of either types *A*, *B* or *C*, in which cases, comparatively rare, the committee submits that the equipment having such conditions be considered "special" and the solution of the problem presented be left for the present, at least, in the hands of the individual carriers or interested manufacturers.

While the committee has every reason to believe that the most shallow head presented in the type *C* permits of good stable construction, there may arise some question as to the limit of head depth decrease which should not be exceeded. The committee anticipates the advisability of ultimately in-

serting the brake beam specifications a requirement of head strength based upon the application of a suitably determined load to the back of the head, set up upon supports in contact with the top and bottom toe lugs.

The committee understands that one of the larger roads has made use of such head test for some time and will probably be able to make definite recommendations as to the advisability of seeing some such test incorporated in the specifications, together with suggested or recommended details thereof, at next year's meeting. This is a question the committee will make the subject of some study.

Fig 4 was circulated to representative members with request for replies to the following questions:

1. Have you any objection to adopting the general plan of brake head layout represented in the attached cut, this layout plan being that represented in Fig. 2 of the committee's report last year and referred to in text thereof?

2. Have you any objection to the committee recommending for adoption brake heads of the three depths shown by Type *A*, maximum conditions, Type *B* and Type *C*, minimum conditions, shown on the attached cut? In other words, do the limiting conditions on your own equipment prohibit general use thereon of the largest Type *A* head? If so, could the smaller types *B* and *C* be used?

To the first question replies were almost unanimously approving, that is, there were no objections registered to adopting the general plan of brake head layout represented.

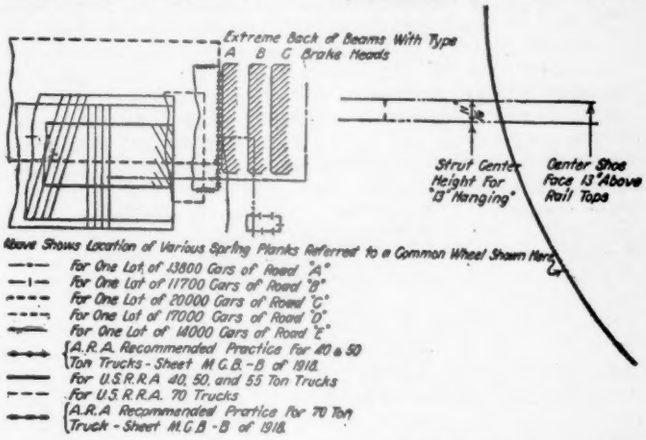

Extreme Back of Beams With Type
A B C Brake Heads
Strut Center Height For "B" Hanging
Center Shoe Face 13" Above Rail Tops
Above Shows Location of Various Spring Planks Referred to a Common Wheel Sheave Horizontal Center Line
For One Lot of 13800 Cars of Road "A"
For One Lot of 11700 Cars of Road "B"
For One Lot of 20000 Cars of Road "C"
For One Lot of 17000 Cars of Road "D"
For One Lot of 14000 Cars of Road "E"
A.R.A. Recommended Practice for 40 & 50 Ton Trucks - Sheet M.C.B.-B of 1918.
For U.S.R.R.A. 40, 50, and 55 Ton Trucks
For U.S.R.R.A. 70 Trucks
A.R.A. Recommended Pratice For 70 Ton Truck - Sheet M.C.B.-B of 1918.

Fig 3.—Location of Spring Planks Relative to Wheel

them to make use of the largest *A* head; some of either the *A* head and the smaller *B* head. The committee is, therefore, assured that no error will be made by adopting the *A*, *B* and *C* heads as recommended.

The report included the method of laying out the brake head

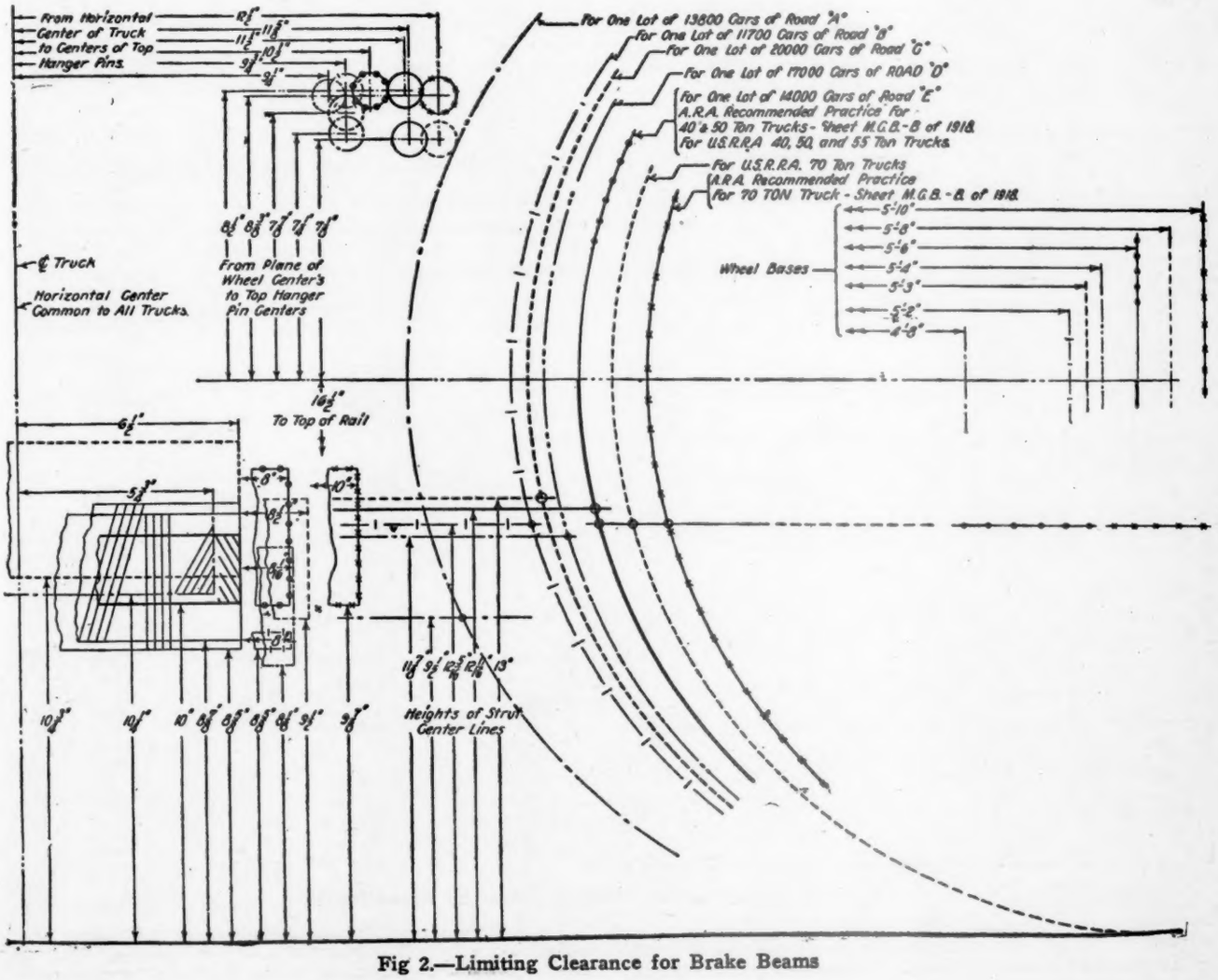

From Horizontal Center of Truck to Centers of Top Hanger Pins
℄ Truck
Horizontal Center Common to All Trucks
From Plane of Wheel Center's to Top Hanger Pin Centers
To Top of Rail
Heights of Strut Center Lines
For One Lot of 13800 Cars of Road "A"
For One Lot of 11700 Cars of Road "B"
For One Lot of 20000 Cars of Road "C"
For One Lot of 17000 Cars of ROAD "D"
For One Lot of 14000 Cars of Road "E"
A.R.A. Recommended Practice for 40 & 50 Ton Trucks - Sheet M.C.B.-B of 1918.
For U.S.R.R.A 40, 50, and 55 Ton Trucks.
For U.S.R.R.A. 70 Trucks
A.R.A. Recommended Practice
For 70 TON Truck - Sheet M.C.B.-B. of 1918.
Wheel Bases
5'-10"
5'-8"
5'-6"
5'-4"
5'-3"
5'-2"
4'-8"

Fig 2.—Limiting Clearance for Brake Beams

To the second question there were practically no objections to the adoption of the three brake head depths, but quantities of reponents made statement that it would be impossible for which was shown in Fig. 2 of the 1919 report, with a development of the vertical section of the brake head face, as shown in Fig. 5, and the brake head gage copied from the latest

standard. The committee recommended that this figure be submitted to letter ballot for adoption as standard.

In Fig. 5 is represented a decrease in the vertical spread between the upper and lower loop hanger openings from 3⅛ in. to 3 in., which was in general use and in the standards for years prior to 1917. The increase from 3 in. to 3⅛ in. was required with an increase in the width of lug face above 1¼ in. This width of lug face is, in the judgment of the committee, satisfactory and much above the widths now more generally in service, most of which, as a matter of fact, do not exceed 1 in. While the general use of the 1¼-in. lug face will significantly improve existing conditions, the committee is of the opinion that any further increase in this width could not be well supported now that the opposite dimension of these lug faces has been for some time extended to the sides of the brakehead.

The center of the pot-hook eye opening is shown as 1¾ in. above the center of the upper loop hanger opening, and back thereof ⅜ in. on a radial line. This latter figure has been increased from ¼ in. to conform to a general practice suggested, if not actually forced, by conditions encountered in design. The previously allowed tolerance of 1/16 in. minus, as applying to the faces of the top and bottom toe lugs, is covered in the figure referred to by note.

The adoption of the conditions and practices represented upon this Fig. No. 5 is basic, so far as concerns much of the further work of your committee, and will operate to significantly and beneficially stabilize brake beam design.

In last year's report the committee made the statement that it would not be, for some time, in position to recommend your adoption a beam having all of its detailed dimensions duly standardized, but assumed to see included in its subsequent report a complete beam fully dimensioned, for the benefit of any who might be concerned in making use of such information. In response to this commitment, Fig. 6 is herewith submitted.

In its last year's report the committee suggested the advisability of eliminating from the Standard and Recommended Practice text all unnecessary duplication, and of reducing it to little if anything more than specifications for brake beams and brake shoes. This has been effected through contribution, consistent with the committee's thought on this matter, to the manual. The committee's thought that the proceedings should be classified and

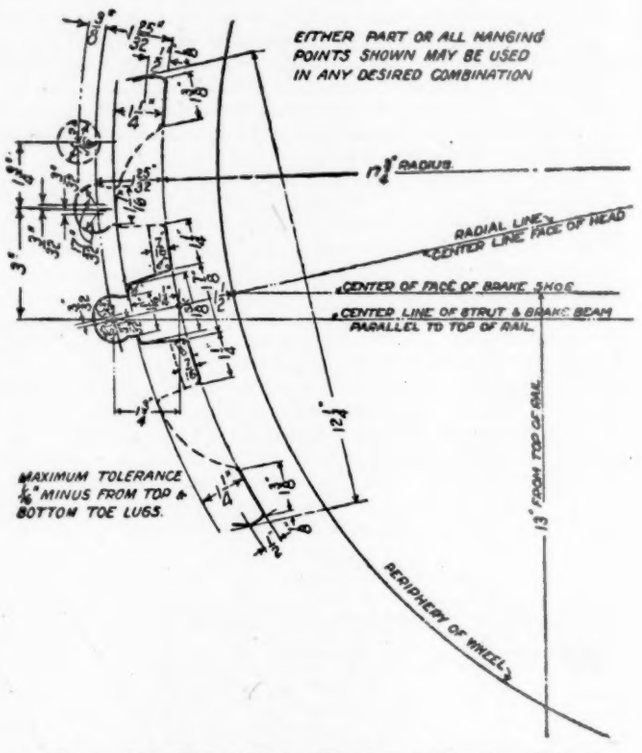

EITHER PART OR ALL HANGING POINTS SHOWN MAY BE USED IN ANY DESIRED COMBINATION
17¾" RADIUS
RADIAL LINE CENTER LINE FACE OF HEAD
CENTER OF FACE OF BRAKE SHOE
CENTER LINE OF STRUT & BRAKE BEAM PARALLEL TO TOP OF RAIL
13" FROM TOP OF RAIL
12½"
MAXIMUM TOLERANCE 1/16" MINUS FROM TOP & BOTTOM TOE LUGS.
PERIPHERY OF WHEEL

Fig 5.—Details of Brake Head and Hanging Points

given the advisability of presenting a report on the state of the art as regards brake beams and brake shoes, particularly the latter, on account of freedom which could be exercised this year by reason of patent expirations, to the consideration of replacing previous existing cast iron shoe design with design covering the practically universally used "steel-backed" shoe. Through circular inquiry of representative members and of

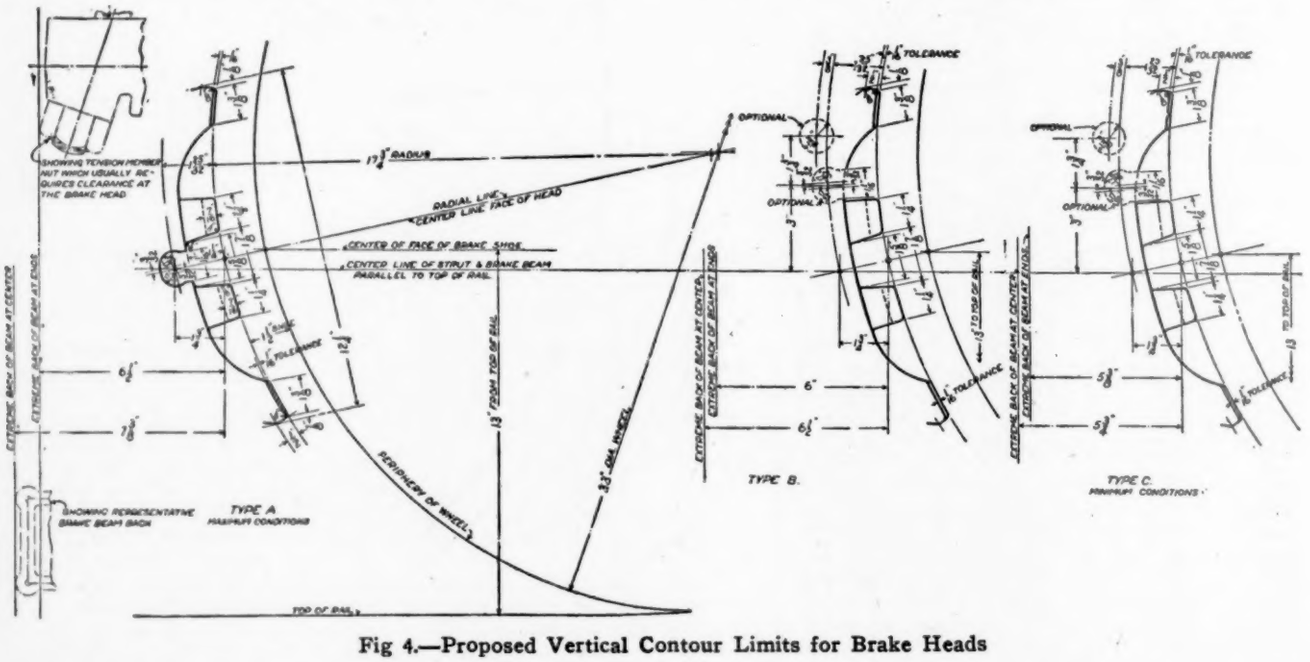


Fig 4.—Proposed Vertical Contour Limits for Brake Heads

indexed so that any part of the history of the subject, in so far as the proceedings reflect, should be immediately available to any one interested therein, has been covered in the general proceedings' index which, it is understood, has been arranged by the secretary.

This committee reported last year that consideration was being given to the matter of a standard brake shoe, and that the committee was of the opinion that the time was not opportune for the adoption of a standard. The committee recommended that this matter be given further consideration. The committee has given the matter further consideration and is of the opinion that the time is not opportune for the adoption of a standard brake shoe. The committee recommends that this matter be given further consideration.

This committee reported last year that consideration was being given the advisability of presenting a report on the state of the art as regards brake beams and brake shoes, particularly the latter, on account of freedom which could be exercised this year by reason of patent expirations, to the consideration of replacing previous existing cast iron shoe design with design covering the practically universally used "steel-backed" shoe. Through circular inquiry of representative members and of brake shoe manufacturers located, the committee finds that the "steel-backed" shoe, in some form, is in practically universal use; although, by prints submitted from many roads, the M. C. B. cast iron shoe is represented. The committee is of the opinion that in arranging Fig. No. 7 herewith, the adoption of which is recommended, the committee is

merely giving form to or interpreting an almost universal demand, or conforming to what is now very nearly universal practice. The changes in the shoe design which are represented in the figure referred to, from previous standard sheets, are as follows:

1. The shoe will be steel backed instead of cast iron, the former being practically universally used throughout the country.
2. The ⅛-in. recess heretofore shown at the back of the shoe between the center fastening lug and the shoe ends has been eliminated because, although shown in the M. C. B. Proceedings for years, it has not been used for a long time. As a matter of fact, this recess could only create breakage liability.
3. The overall length of the shoe has been increased by the addition of 3/16 in. metal at the top and bottom of the shoe, that is, by increasing the overall length from 13⅜ in. to 13¾ in., which has been very generally adopted practice for some time. Aside from affording additional strength for the lugs which pass over the ends of the brake head, as in the case of the ordinary cast iron shoe, this additional length and strength was forced with the use of the steel backs which generally extend from the center of the shoe out to near the ends thereof farther than the inside face of the top and bottom lugs.
4. The top and bottom guide lugs, instead of being recessed as heretofore shown, have been shown built up to the height of the adjacent top and bottom cross bearing lugs. The new arrangement is in almost universal use and the old one, aside from the fact that it has not been used for some time, is unsuitable and unnecessarily complicated.
5. The key slot has been shown increased from 9/16 in. to 13/16 in. depth by removing the metal from the bottom of the key opening which is outside the 17¾-in. radius which sweeps the back of the shoe.
6. In conformity with what has been actually very general practice throughout the country, the committee has selected as the inside brake shoe radius 17 in. in lieu of 16⅜ in., which has been shown upon the standard sheets for years.

On account of the variation in the diameters and radii of various wheel sections, that is, since a new 33-in. wheel is of that diameter only at the "taping" point, and the further fact that all diameters, and with them the inside radii of shoes, fit one another very shortly after the first application of brakes and from then on throughout the life of the shoe and wheel, the precise selection of the initial inside shoe radius is of comparatively little import so long as it is reasonable. The committee recommends the continued use of the 17-in. inside shoe radius for, in part, the reason that the use of this radius will give initial shoe bearing upon the center brake head lugs, whereas the 16⅜-in. radius previously shown by your standards will give upon any wheel not well worn, initial bearing at the shoe

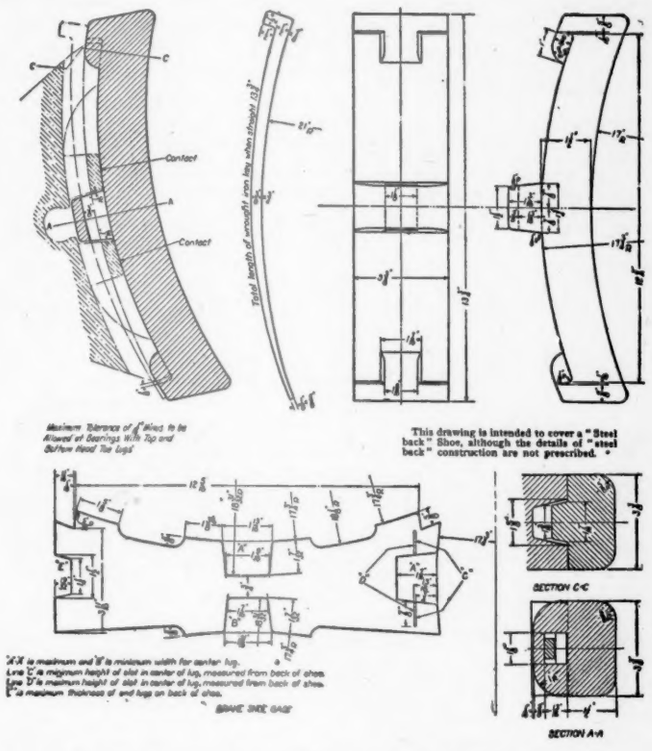

Contact
Contact
This drawing is intended to cover a "Steel back" Shoe, although the details of "steel back" construction are not prescribed.
SECTION C-C
SECTION A-A

Fig 7.—Proposed Standard Steel Back Brake Shoe

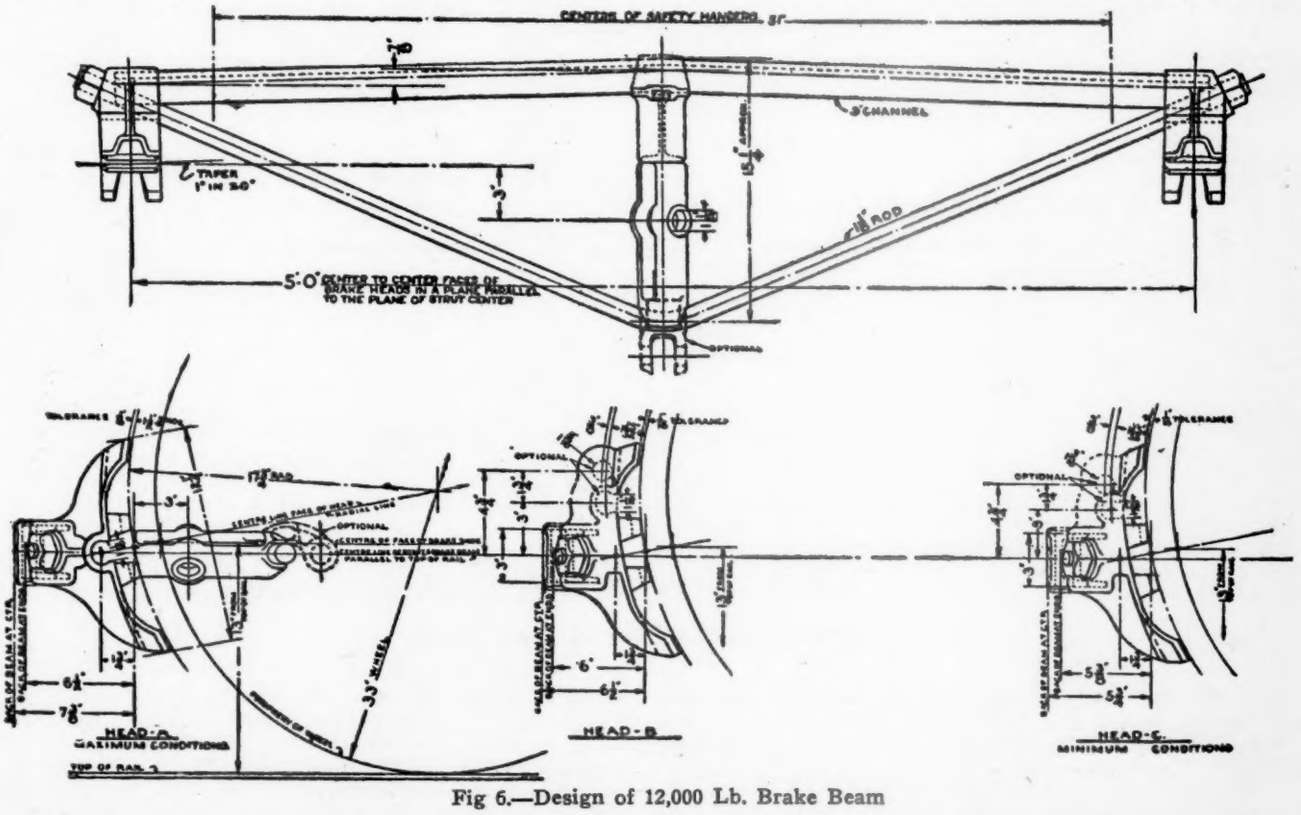


Fig 6.—Design of 12,000 Lb. Brake Beam

ends, thereby introducing the possibility of early shoe breakage.

It has been suggested that the thickness of the shoe should be increased from 1½ in. to 1¾ in. with a corresponding increase in weight from 20 lb. to 23 lb., the argument for such increase being based upon a decreased cost of shoe material consumed and a decreased cost of applying shoes which is represented in the following statement:

1½ in.—20 lb. shoe at 3 cents per lb.....$.60 per shoe.
10 lb.. scrap recovered at 1½ cents per lb.....$.15 Reclamation value.
10 lb. of shoe consumed at $.045 per lb.....$.45 Net cost per shoe.

This amounts to $90.00 per ton of shoes consumed.

1¾ in.—23 lb. shoe at 3 cents per lb.....$.69 per shoe.
10 lb. scrap recovered at 1½ cents per lb.....$.15 Reclamation value.
13 lb. of shoe consumed at $.0415 per lb.....$.54 Net cost of shoe.

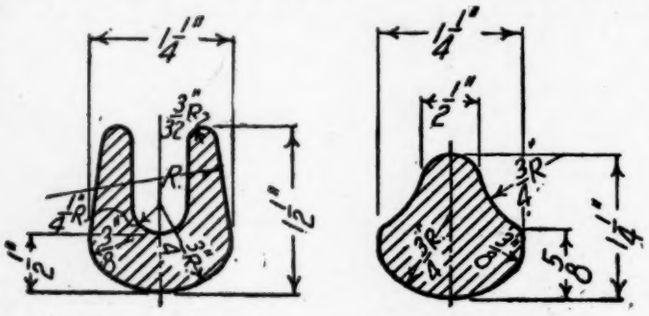


Fig 8.—Section of Metal Surrounding Pot-hook Hanger Hole

This amounts to $83.00 per ton of shoes consumed, a saving of $7.00 per ton.

In addition thereto, there will be labor savings in application, since the application of 100,000 lighter shoes will give 1,000,000 lb. consumed shoe material, which, if consumed at the rate of 13 lb. per shoe of the heavier type will necessitate the application of but 78,000 shoes versus 100,000, that is, a saving in the application of 22,000 shoes per 1,000,000 lb. of shoe material consumed.

The committee assumes to make this matter the subject of study during the coming year, which will, of course, involve application and other difficulties which the increased shoe thicknesses may involve. It is known that upon several roads use is now being made of shoe thicknesses above 1½ in. and in some cases the 1¾ in. suggested.

The committee appreciates the advisability of making the contour of the outside corners of the top and bottom head lugs, together with the form of the adjacent recesses in the shoe, the subject of some study during the coming year. Attention will also be given to some alterations which appear advisable in the details of key design in conjunction with attention to the dimensions of both shoe and head face, which concern the fit of the shoe, head face and key, when the latter is in place, also shoe and brake head bearing areas. Inconsistency in present key dimensions will be apparent from a comparison of the three section dimensions now and heretofore shown, the use of which obviously can not result in uniformity of taper in both section dimensions. The inside top corner of the key obviously should show a larger radius for shop reasons.

The design of pot-hook hanger eye section shown by Standard Sheet 17-B of 1918 appears to be objectionable, and it is recommended that this section be replaced by the suggested section exhibited by Fig. 8.

In the first place, the present section necessitates the use of a core objectionable, for obvious reasons, from a cost and production standpoint. Patterns must be arranged to provide for the additional core and special care must be exercised to avoid core shifting and consequent casting losses. A larger size of flask must also be used, together with more sand, which increases the weight of the mold and production cost. All of the above operates to force the work from machine to hand or bench patterns. The advantages of the proposed section from the standpoints cited should ultimately, if not promptly, revert to the consumer in cost adjustment. Having considered the points involved in the case, the committee is of one mind in recommending replacing the present U-shaped section with the recommended section of the figure referred to.

In accordance with the suggestion in the committee's report of last year, there has been arranged a new brake beam limiting outline drawing represented in Fig. 9. The distance, 1¼ in., shown in Sheet 17-A of 1918 between the extreme limit of the brake beam back to the extreme back of the head opening has been reduced to ⅞ in., as required by beams manufactured for some years and in extensive current use, in accordance with an understanding which files indicate was conclusively considered some years ago by the committee; however, not cared for in drawings—evidently inadvertently.

Within the tendered limiting outline are shown the brake lever angle, the location of brake lever pin hole with reference to the brake head faces, the spacing between shoes definitely defined, and the backs of both brake heads and the strut castings in the case of brake heads of the types *A*, *B* and *C* referred to in this report. Adherence to the brake pin location prescribed, that is, either 2 in. or 3 in. ahead of the center of brake head faces, will contribute significantly to the improvement of brake beam conditions. The importance of approaching a standard in this regard must be apparent when one gives thought to the results of exchanging beams wherein the locations of the pin holes referred to are at variance. The committee is unable to recommend exclusively either the 2 in. or the 3 in. for the reason that use of the one or the other is dependent upon the beam hanging arrangement, that is,

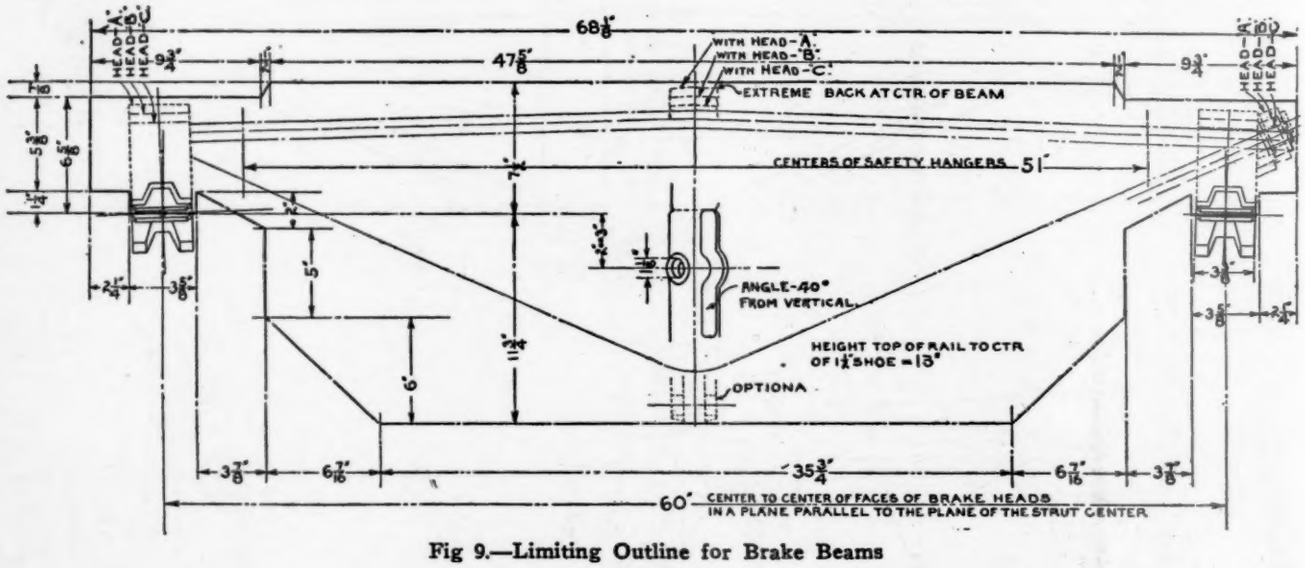

WITH HEAD-A
WITH HEAD-B
WITH HEAD-C
EXTREME BACK AT CTR. OF BEAM
CENTERS OF SAFETY HANGERS
ANGLE-40° FROM VERTICAL
HEIGHT TOP OF RAIL TO CTR OF 1¼" SHOE = 13"
OPTIONA
CENTER TO CENTER OF FACES OF BRAKE HEADS IN A PLANE PARALLEL TO THE PLANE OF THE STRUT CENTER

Fig 9.—Limiting Outline for Brake Beams

more particularly to whether the lower loop hanger opening is used or not. While this pin hole location is found to frequently vary from the 2 in. or 3 in. dimensions referred to, the 2 in. dimension is generally conceded as the favored location in connection with the upper loop or pot-hook hanging, and the 3 in. location with the center or lower loop hanger opening.

The committee is of the belief that opinions will crystallize ultimately about the exclusive use of the 3 in. location, and contemplates giving the matter particular attention during the coming year, upon basis of which it is hoped that specific recommendations may be made in the next year's report in connection with the general brake beam hanging question.

As arranged, the limiting outline tendered in Fig. 9 should replace those portions of Sheet 17-A of 1918 headed "Brake Beam" and "Limiting Outline for Brake Beams," all information therein being covered with the exception of the "limiting contour gagehead" which, so far as the committee is advised, has never been used. This figure the committee recommends passage to letter ballot for adoption.

The committee recommended that drawings taken from Sheets 17-A and 17-B of 1918 covering brake beam gage, details thereof, angle gage for strut, lever pin hole gage, malleable iron strut and markings be passed to letter ballot for adoption. In the gage drawing changes have been made in two dimensions to render it consistent with the brake head layout procedure which the committee is, in this report, recommending for adoption. No other changes from previously existing standards are represented.

The committee, in making some study of the "reversible strut" finds that the idea originated some twenty years ago. Records show that reversible struts were used on brake beams more than fifteen years ago, but that their use was shortly afterwards abandoned as the struts did not prove entirely satisfactory. The committee's investigation points out conclusively that a substantial strut in a brake beam is very necessary.

The only advantage in the reversible strut beam is that, being convertible into either right or left, as may be required, it assures the protection of all requirements with minimum stock. It eliminates the possibility of having on hand a large stock of rights and no lefts, or vice versa. It is particularly desirable for isolated repair points where very small stocks of parts are maintained, at which the use of the reversible strut makes it possible to supply occasional brake beam needs more promptly and without delay to equipment.

The reversible strut of present three-piece design is not satisfactory for application with higher capacity brake beams, although it seems that it performs acceptable service in connection with lighter capacity brake beams. The reversible strut is more expensive to manufacture than the rigid one-piece strut. It is impossible for a reversible strut of present three-piece design to be as stable and serviceable as the one-piece solid strut because of the number of parts of which the reversible strut is composed. The strut carries the brake lever and all stresses are delivered through it, and it is, therefore, necessary that this part must be strong and substantial.

A general survey of the information furnished by the brake beam manufacturers, as well as that obtained from the different railroads, indicates that the reversible strut is not now being applied to any great extent, in fact, its use has been largely curtailed. A design has not yet been worked up and marketed which has been accepted as satisfactory for present-day equipment.

While brake beam manufacturers are generally not in favor of the reversible strut and are reluctant to recommend its use, it is believed that the subject should not be passed without further study, which the committee assumes to see the subject given during the coming year. A reversible strut of ample strength so constructed as to transmit satisfactorily the stresses imposed by the brake lever should meet the conditions of the present one-piece strut without fear of weakness and failure.

In the previous standards, the deflection load for the No. 5 beam is shown as 30,000 lb. The commercial sizes of material which may be most efficiently used for the construction of beams approximating this capacity lend themselves neatly to the construction of a 28,000-lb. beam, on which account the committee recommends that the deflection load for the No. 5 beams be changed from 30,000 to 28,000 lb. In order to produce a 30,000-lb. beam, it is necessary for the manufacturers to resort to the use of material of commercial sizes, which lend themselves to the construction of a much higher capacity beam than it was intended should be represented in this No. 5 beam. Of course, consistent modifications in set loads and ratio of set loads to deflection loads should carry through with this alteration.

Summarizing, the committee assumes during the coming year to give attention to the following subjects:

1. The development of a gage to be used for the purpose of determining the "hanging heights" of existing beams.
2. Some code of instructions governing brake beam maintenance practices.
3. The advisability of introducing into the specifications some form of brake head strength test.
4. The advisability of increasing the initial brake shoe thickness from 1½ to 1¾ in.
5. Details of contour for top and bottom head lugs and the recesses of brake shoes adjacent thereto.
6. Brake shoe key design and details involved in the fit of shoes, head faces and the key.
7. The general brake beam hanging question.
8. The reversible strut question.

The committee recommends for letter ballot action, the following:

1. The adoption as standard of brake beams of both 12,000 lb. and 15,000 lb. capacities.
2. The adoption of the *A, B* and *C* brake head depths shown on Fig. 4.
3. The procedure for laying out brake beam drawings and other information shown upon Fig. 5.
4. Brake shoe key and brake shoe gage, shown upon Fig. 7.
5. The adoption of the altered section of the loop hanger eye, represented in Fig. 8.
6. The recommended limiting outline shown as Fig. 9.
7. Brake beam gage and strut information with recommended changes.
8. Alteration of the deflection load of No. 5 beams from 30,000 to 28,000 lb. with appropriate alterations in set loads and in ratio of set loads to deflection loads.

The report is signed by B. B. Milner (Chairman), N. Y. C.; C. B. Young, C., B. & Q.; H. K. Fox, M. & St. P.; F. M. Waring, Pennsylvania System; W. J. Bohan, N. P.; M. H. Haig, A. T. & S. F.; C. F. Thiele, Pennsylvania System, and C. H. Benjamin, Purdue University.

Discussion

The committee's report was read by W. J. Bohan (N. P.) and the room darkened to show moving pictures of brake beam hanging conditions as found on cars today,

T. H. Goodnow (C. & N. W.): It is the intention to show the details of the No. 2 beam in the M. C. B. standard sheets. If I remember correctly, the No. 2, 12,000-lb. beam, is not shown at the present time, it is simply mentioned in the text, and I note in the summary that nothing is said about that. I feel that the 12,000-lb. beam is going to be acted upon as suggested here; that it would also be necessary to show the details of construction of that beam in the standard. I note that the attachment of the head to the beam is shown. It has been customary in the past to show only the contour of the head and leave the attachment for the particular side of beam the heads were used on. In Fig. 6, for the 12,000-lb. beam, I notice the attachment of the head is shown also. Is it the intention to include that at this time?

Mr. Milner: Fig. 6 is inserted in the report as a matter of information only to those who may be concerned. We do not desire you to pass Fig. 6 to letter ballot for consideration. So far as concerns any conflict in the design details, which will be represented in questions submitted to letter ballot between 12,000 lb. beam and 15,000 lb. beam, the committee has not yet proceeded so far with the details of brake beam design to meet any question in which there is any conflict in design.

A. R. Ayres (N. Y. C. & St. L.): In regard to the three proposed types of head, A, B and C, I would like to ask if the suggested head with a minimum clearance is a satisfactory head, what particular purpose is served by having two other designs. What I have in mind in connection with that question is the

Conventionalities

During the noon hour yesterday the members of the Entertainment Committee gathered in the executive offices on the pier and presented their chairman, W. E. Krepps, with a handsome suitcase.

James Coleman, assistant to general superintendent motive power and car department of the Grand Trunk, and vice-chairman of the Mechanical Section, is accompanied to the conventions by Mrs. Coleman and their daughter, Miss Nora.

Mr. and Mrs. J. F. Dunn, of Salt Lake City, are not here this year. They have just returned from a trip to Honolulu to their California home. Mr. Dunn was for many years superintendent of motive power of the Oregon Short Line. It is hoped that next year Mr. and Mrs. Dunn's many friends will see them at the convention.

Two of the real veterans at the convention are Miss Mary Fuller, daughter of Mr. and Mrs. C. E. Fuller, and Miss Emily Spear, daughter of Mr. and Mrs. Grant W. Spear. They both began coming nine years ago, which, considering their ages then and now, undoubtedly enables them to qualify as veterans. Their fathers, however, have been using that word "veterans" with an implication that is threatening trouble.

The Rock Island was represented on the Pier by two of its vice-presidents yesterday. They were L. C. Fritch, to whom the valuation, mechanical and engineering and maintenance of ways departments report, and George W. Reed, vice-president and purchasing agent. Mr. Reed came to attend the Purchases and Stores convention and is accompanied by Mrs. Reed and their son, George.

The National Railways of Mexico are represented by Sr. F. P. De Hoyos, general agent and purchasing agent, and Sr. H. V. Garza, assistant general purchasing agent, both with headquarters in the Woolworth building, New York. Mr. Garza states that telegraphic inquiries are coming in for tires, flues and other varieties of railroad supplies.

Former General Superintendent of Motive Power H. J. Small, of the Southern Pacific, found it impossible to come to Atlantic City this year. To friends he sends his regrets at being unable to be here. Those who know of Mr. Small's untiring work for years in making the mechanical associations and their conventions bigger and better will regret their inability to extend to Mr. Small their tokens of admiration and friendship.

Mr. and Mrs. Burton W. Mudge are not accompanied to the convention this year by their son, Burton, Jr., who formerly was a regular attendant. Burton, Jr., is very busily engaged just at present in preparing for the examinations preliminary to his entrance to college. His friends will regret to learn that Burton, Jr., recently suffered an accident, being hit on the nose by a ball while playing base ball. The injury was properly cared for at once, however, and it is believed that he will not be disfigured.

Joseph Robinson, of the Robinson Connector Company, is attending the conventions this year for the first time since 1916. Mr. Robinson is one of the pioneers in the automatic connectors and if the interest displayed by railroad men at this convention is an indication of the trend of events, it is quite probable that in the near future we will be discussing automatic couplers in the same "take it for granted" way that we do many of the essential devices now in use. A number of roads have already installed experimental equipment with a view to more complete installation.

There is an impression growing on the boardwalk that the Railway Supply Manufacturers' Association considers personal pulchritude as well as business ability and other qualifications in selecting its officers. Its president this year is George Carr; its newly elected president is Jack Schurch; its newly elected vice-president is Charlie Jenks. Do you know of three better looking men who attend the conventions? Will Sharp the other day dubbed them the Three Musketeers and himself was immediately nominated for the part of d'Artagnan, who it will be remembered played the fourth hand in Dumas' immortal romances.

Mr. and Mrs. George H. Ross are meeting many old-time friends in Atlantic City. They are stopping at Galen Hall. Mr. Ross, now retired, was one of the best known railway executives in the United States. He was born in Boston, Mass., in 1854, and entered railway service in 1877 as expense bill clerk for the Chicago, Burlington & Quincy. He made rapid advancement and remained with this road until August, 1898, when he went to the Indiana, Illinois & Iowa as traffic manager. In December, 1902, he became president of the Union Depot Bridge & Terminal Company, of Kansas City. In 1904 he went to the Toledo, St. Louis & Western as general traffic manager, and in March, 1905, he became vice-president of this road. Later he became executive vice-president of the Hawley group of railroads.

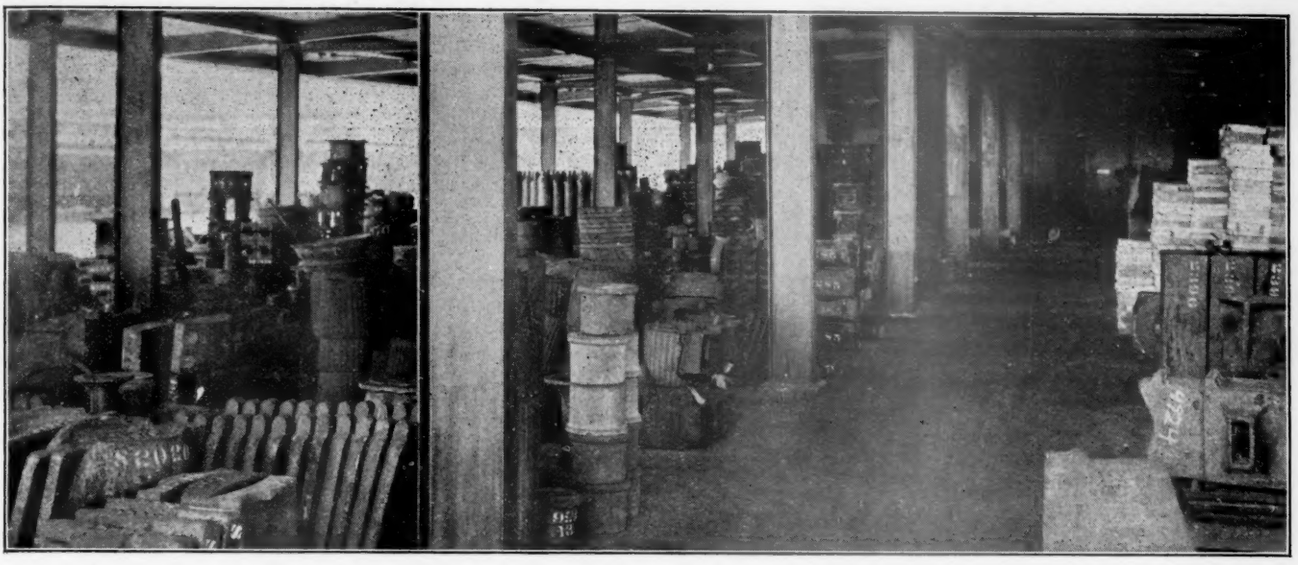
Practically all of the former regional fuel supervisors are attending the convention this year. Among those holding forth in the supply booths are H. C. Woodbridge, F. P. Roesch, and Leslie R. Pyle, formerly fuel supervisors in the Allegheny, Northwestern and Central Western regions, respectively, and C. M. Freeman, formerly assistant supervisor of the Central Western region. Mr. Woodbridge is now with the Locomotive Stoker Company, Mr. Roesch with the Standard Stoker Company and Mr. Pyle with the Locomotive Firebox Company. Mr. Freeman is a representative of the brass goods department of Manning, Maxwell & Moore at St. Louis. The only former fuel supervisor, still in railroad service, who has been in attendance at the convention is Robert Collett, now in charge of the fuel department of the New York Central.

(*Proceedings continued from preceding page.*)

carrying of a stock of beams for the cars of other roads. If you had a *C* type of head, which was the standard, it would go anywhere.

Mr. Milner: The point which Mr. Ayres raises is well taken, and has been considered by the committee. The committee hopes to be able within two years, perhaps sooner, to recommend that the three heads now suggested be replaced by one or two instead of three. We are not in position, at this time, to suggest that it is possible to arrange satisfactory heads of the minimum depth represented by the type *C*.

A motion that the report be printed and referred to letter ballot was carried. The meeting was adjourned until 9.30 o'clock on Wednesday morning.



American Railroad Association, Section VI, Purchases and Stores

Moving Picture of the Southern Pacific Supply Train Operation a Feature of the Session

THE meeting was called to order by the chairman at 9:30 a. m. In opening the meeting Chairman Pearce made the following remarks: We have a very busy day before us in order to accomplish even a portion of the work which we must accomplish. The program is to try and complete all of the subjects before three o'clock, when the exhibition of the moving pictures will be given, but we will not do that at the expense of running over reports. We prefer to dispose of a report rather than to partially finish it.

Report on Reclamation of Material

THE COMMITTEE ON RECLAMATION OF MATERIAL has considered thoroughly this constantly broadening subject, and is of the opinion that the excellent report at the 1915 meeting, fully covers the basic features, also the paper read by Mr. Stuart at the 1919 meeting deserves careful perusal.

The committee has taken for granted in the absence of a better ruling that any article found in the scrap at a general scrap yard, which is picked out and repaired satisfactorily and put back into stock or into use, after having been discarded by the department using it, is thereby reclaimed. Also articles that are manufactured from material found in the scrap is reclamation. A few articles should be included in this classification that are manufactured at the reclamation plant from material sent in for that purpose as if too fine a line is drawn it may serve as a damper to the movement.

The reclamation movement should contain a plant centrally located off by itself where no other department will interfere with its organization. On many railroads the committee has found reclamation committees consisting of the division storekeeper as chairman and containing the heads of division departments, meeting periodically, have worked wonders, even going beyond their best expectations. These committees meet and send minutes of their meetings to a head committee. The head committee circulates the best in these minutes all over the railroad so that everyone will benefit by the new ideas. This gets the other departments interested in savings and co-operatively working with the stores departments. Also a page or two of the monthly employes' magazine devoted to reclamation and scrap handling has created enthusiasm. What is needed in reclamation work is the support and co-operation of all departments as well as the backing of all the officials.

The committee also finds that quite a few of the railroads keep insufficient records of their reclamation costs, or scrap handling. This is a vital part of the work. No reclamation should ordinarily be done unless it is a saving and when there are no figures or accounting system the department is placed in an awkward position. Our officials also wish to know if our work is on a business footing and warrants its continuance. We think it is and probably at some remote period made a test run to see how much of a saving was made.

Due to the lack of proper accounting for reclamation and scrap handling on a number of railroads, the committee submitted forms to be used in arriving at this end, which it is hoped will satisfactorily apply to all railroads.

The report included forms for a daily report of cars held under load, for a record of material received at the reclamation plant, for the superintendent of reclamation plant's shipping notice on general storekeeper, record of scrap material shipped from reclamation plant, standard list of reclamation orders, and reclamation time sheet.

Reclamation Plant Shop Order Ledger

Form 3-7 is prepared on the first day of the month to cover each reclamation plant order, per Form 3-5, standard list of reclamation orders. This form is dated the first day of each month, and in the caption "Account Chargeable To" the reclamation plant order is inserted. In the space provided, complete description of the article is written, designating whether the material is for the stores department, if so, requisition reference is given, or if the material is for the mechanical department, this information is shown.

At the close of each day's business, all labor is posted from the reclamation time sheet. Also all material is abstracted from material ticket covering new material received from the store house and scrap material that is received from the scrap dock.

By posting material and labor daily, it can be ascertained at

any time of the day, week, or month, the saving that is being effected, which is of special value. At the close of the month, invoices for material delivered from the reclamation plant to the stores department and the mechanical department are abstracted on this form, which reflects the number of items repaired, the value new as shown by the storehouse, and the total value of the material reclaimed. Each form is then totalled in order that the total figures be used in preparing the operating statement.

DATE ISSUED_____ 191__ SHOP ORDER LEDGER ACCOUNT CHARGEABLE TO_____ SHOP ORDER No._____

For

Store Department Requisition Reference.

Date of Labor Charge	Amount of Labor	Date of Material Charge	MATERIAL	Amount of Material	Total Labor For Month	Total Material For Month	CLOSING TOTAL

Form for Compiling Labor and Material Charges

Statement of Operation at Reclamation Plant

Form 3-8 is prepared at the close of each month's business by the Superintendent of Reclamation, securing data from Form 3-7, showing the following information:—

Month and year—Reclamation Order Number—Class of Material—Net Weight—Quantity Reclaimed—Value of Scrap Material Used—Value of New Material Used—Total Labor—Supervision—Miscellaneous Shop Expense. Columns 5, 6, 7, 8 and 9 equal column No. 11. Column No. 10 is secured by dividing total of column No. 4 into column No. 11. Column No. 12 is secured by dividing column No. 4 into column No. 13. Column No. 14 is arrived at by the difference between column No. 10 and column No. 12. Column No. 15 is secured by subtracting column No. 11 from column No. 13.

STATEMENT OF OPERATION AT RECLAMATION PLANT

For the Month of_____ 191__

	Reclamation Order No.	CLASS OF MATERIAL	Net Weight	Quantity Reclaimed	Value of Scrap	Value of New Material	Labor	Supervision	Misc. Shop Expense	COST		VALUE OF NEW		SAVING	
										Per Unit	Total	Per Unit	Total	Per Unit	Total

Summary of Charges and Savings Effected

A recapitulation is prepared to cover each month's statement. This statement is used to arrive at journal vouchers, which reflects to material delivered to stores stock, and the difference between the value of new material and cost of repairs.

The reclamation of second-hand parts to secure maximum economy should be based on exact knowledge of the demand for the parts in question as such or for other parts in the manufacture of which second-hand material can be used as well as of the best and most economical means for the handling of such reworking of the material as may be necessary.

These requirements presuppose a knowledge of mechanical processes as well as of material in stock and in demand. The storekeeper has the most complete information concerning second-hand material available as well as the demand for new material of all kinds. The department using the material are best qualified to determine whether the reworked or repaired article will be satisfactory for the service intended. It is, therefore, vitally important that there be the closest co-operation between the stores and other departments to insure the best and most economical results.

The shop people while vitally interested in costs, must get from their plant the required output of cars and locomotives, and particularly if working at high pressure, will tend naturally to regard the reworking of old material, especially parts not used locally or of which they have on hand an ample supply, of secondary importance. The storekeeper on the other hand is directly interested in keeping purchases of new material at a minimum, and therefore, in utilizing old material to the fullest extent possible. He will not be influenced in the recovery of old material by the situation at any local point, but will consider the question from the general standpoint of the requirements of the road as a whole. It, therefore, seems to the committee that the general subject of reclamation on the different roads should be supervised by the general storekeepers to the end that the fullest use consistent with safe and economical operation shall be made of second-hand material, and to that extent avoid greater expenditures for new material that would otherwise be necessary. As previously indicated, however, it is of the greatest importance that there be the closest co-operation among all departments in handling this matter in order that the work incident to restoring second-hand parts to a serviceable condition may be performed in the most economical manner, and that the repaired parts may be satisfactory for the service to which they are to be applied.

The organization necessary for handling the scrap dock and reclamation plant work including foreman or other supervisors, clerks, machine hands or mechanics, scrap sorters and laborers will vary with the size of the plant and the amount of work to be handled. It is, therefore, deemed inadvisable to attempt to outline a proper personnel for such an organization.

In preparing the accompanying statement of suggested practices the committee made no check of costs and the foregoing comments should therefore not be lost sight of in making these practices effective.

The report is signed by Wm. Hunt (Chairman), W. & L. E.; D. A. Williams, B. & O.; R. J. Elliot, N. P.; J. E. Mahaney, S. A. L., and H. E. Ray (Ex-Officio), A. T. & S. F.

Discussion

Chairman Pearce: The subject of reclamation is so broad and intricate that it cannot be expected that we can dispose of all the details relating to it at this time. This committee has studied the work that has been done on different railroads, and its report is based on the most practical operation which it has found, and, as such, is merely a resumé of the best practices which they have discovered in operation.

Wm. Hunt: (W. & L. E.) The report is merely an elaboration of the report that was gotten out by the committee

SUGGESTED PRACTICES TO BE FOLLOWED IN SALVAGING OR REWORKING SECOND-HAND MATERIAL.

Item	*Operation*	*Equipment Required*
Axles, scrap	Upset and refinished to smaller size.	Work done on forging machine, air operated press or battering ram.
Axles, scrap	Larger sizes of car axles turned down to make engine truck axles.	Engine Lathe.
Axles, scrap	Worked over under steam hammer to make miscellaneous forgings including knuckle joint pins, piston rods, equalizers, crank pins, valve rods, valve yokes, crosshead keys, track wrenches, crosshead arms, back end of main rod keys, key bolts, spring plank carriers, eccentric cranks, link bridles, lap and lead levers, radius rods, crosshead guides, side rods and other motion parts, also forge down into round stock from which knuckle joint pins, brake pins engine bolts and similar parts are made. Also rework into arch bars of odd sizes and other forgings for passenger and freight cars. This material also used for making tamping and clay pick ends, and for making machine tool bodies.	Steam hammer, drop hammer, dies, engine and turret lathe.
Bars, claw	Redress and straighten. Apply new ends as needed.	Small oil furnace, small power hammer.
Bars, angle	Worn holes plugged by riveting and new holes drilled.	Pneumatic hammer and small frogs.
Bars, angle	Straightened.	Steam hammer, dies and oil furnace.
Bolts, large diameter	Long bolts 1 in. diameter, and larger made by welding two pieces of old bolts together.	Smith Shop Equipment.
Bolts, Car	Straighten, sort to size, shear to required length and rethread.	Quick acting power hammer, power shear, multiple spindle bolt cutter.
Bolts, Engine	Cut down to make smaller sizes of finished bolts. If desired bolts can first be rehexed and annealed. It may be possible to rework valve motion pins to some extent to make smaller sizes.	Usual machine shop equipment, lathes, bolt skimmer, etc.
Bolts, Track	Straightened if necessary and rechase threader recut thread to smaller size. Where threads will stand rechasing a very satisfactory job can be made using slightly opened standard dies. Where original thread is gone a new thread can be cut of smaller diameter and reclaimed bolts used in yard and side tracks and possibly on unimportant branches.	Quick acting power hammer, multiple spindle bolt cutter.
Beams, Brake	Straighten beams and renew damaged parts. Worn brake heads may be built up by electric welding.	Assembly table equipped with air operated clamps, oil furnace, power press for reforming beams and truss rods; pneumatic riveter, electric welding. (If brake heads are built up.)
Borings, Brass and Turnings	Separated from iron and steel by magnet separator and used or sold. Tailings also sold.	Magnet separator.
Butts, Old Pile and Bridge Timber	Resawed to make standard size lumber.	Resaw plant.
Cable, second-hand steel	Good portions saved by splicing larger sizes made into switch ropes for caboose equipment.	No special equipment.
Carpets, old car	Reclaimed and used for patching. To some extent used for making rugs.	Usual upholstering shop equipment.
Compound, Old Driving Journal	Put into receptacle formula add water, lye, graphite, valve oil, stir thoroughly. Remove and cool, press into suitable forms.	Metal receptacle for boiling.
Cans, Empty Carbide	Made into shop waste receptacles.	Tinshop Equipment
Couplers	Bent shanks straightened.	Steam hammer or hydraulic press.
Couplers	Cracks welded. Wide variation of opinion as to advisability. A great deal depends upon education and ability of operator.	Oxy-Acetylene or Electric Welder.
Couplers	Butts rebuilt, adding stock to make different size butt.	Acetylene Torch.
Cutters, Rail	Redress.	Small power hammer, forming dies, emery wheel, small oil furnace.
Cocks, angle and cutout	Repair and regrind.	Angle cock grinding machine, small speed lathe.
Doors, Grain	Make ordinary repairs.	No special equipment.
Drills, Track	Repaired and returned to service using old serviceable parts as far as practicable.	No special equipment.
Fittings, Pipe	Remove from second-hand pipe, retap where necessary, soak in oil and return to stock.	Pipe vise, bench equipped with necessary taps, oil vat and immersing cage for dipping fittings.
Frogs, Worn Rail	Repaired by building up worn surfaces with acetylene welding equipment. Also worn frog points and wings repaired by heating and swedging to standard height.	Acetylene welding equipment, portable power driven emery wheel. Nickel steel or No. 2 commercial welding rods are stated to give good results.
Frogs, Worn Rail	Repaired by renewing worn parts using second-hand parts as far as possible. Also worn frog points and wings repaired by heating and swedging to standard height.	Frog shop equipment, planer, etc.
Glasses, Klinger water gauge	Refaced by grinding with emery and oil.	Hand Operation.
Hose, air steam and signal	Strip off old hose and remount fittings. Test when completed.	Air operated machine for removing fittings. Air operated shear for cutting air hose clamp bolts, air operated clamp for applying air hose clamps. Conveniently mounted crank wrench for applying nuts to clamp bolts. Hose baler.
Iron, scrap sheet iron and steel	Cut up serviceable parts to make patches for steel frt. car repairs.	Throatless or other power shears. Could also use cutting torch.
do	Cut into washers on washer machine.	Power shears, washer machine.
Iron, scrap bar	Certain sizes drop forged into chain hooks.	Drop hammer, furnace, etc.
do	Certain sizes made into roping staples.	Bradley hammer and bulldozer being used for this work.
do	Certain sizes made into car door rod ends.	Forging machine and furnace.
do	Certain sizes made into axles for baggage, warehouse and express trucks.	Smith and machine shop equipment.
Iron, old bridge, flat diagonals	Made into coupler yokes, and variety of articles.	Smith shop equipment.
Jacks, Track	Repaired. Apply new parts as needed.	Ordinary hand tools.
Knuckles, Coupler	Repaired by building up worn surfaces by acetylene welding.	Oxy-acetylene welding equipment, contour gauges, etc.
Kegs, Metal White Lead	Remove one end and equip with bail. Used for sand buckets, fire buckets, etc.	Usual tin shop equipment.
Lagging, scrap magnesia	Pulverized in rotating macerator mixed with sawdust and water molded into blocks and baked in steam-heated kiln. In some cases small amount asbestos cement added. Some pulverize and apply in plaster form.	Macerator, mixing trough, molds, drying kiln.
Levers, brake, guides, connections, etc.	Straighten and return to service. Also worn holes plugged and redrilled.	Smith shop equipment.
Lumber, old	Make into flag sticks.	Cabinet shop equipment.
Nuts	Sort to size, retap and return to stock.	Nut sorting table with required number of pockets, chutes and receptacles, multiple spindle nut tapper. Rattler and dipping vat.
Picks, Earth and Tamping	Redress. Apply new ends if required. New ends can be made from scrap tire or axle steel.	Small oil furnace, small steam or power hammer.

Item	Operation	Equipment Required
Packing, Journal Box or Dope, old	Cleaned and reapplied.	Equipment for removing dirt from waste and oil and resoaking waste for further service, as follows: The best equipment seen included centrifugal oil extractor and filter, power driven rotating tube shaped sifter diagonally hung made of front end netting for removing dirt and grit from the waste, necessary soaking and draining tanks, etc.
Pins, old crank	Annealed and turned down to make smaller sizes crank pins.	Usual shop equipment.
Pipe, old wrought	Recut into nipples.	Nipple or pipe cutting machine. Can use ordinary bolt cutter equipped with pipe dies.
Pins, old knuckle	Straightened and returned to stock.	Smith shop equipment.
Planks, scrap spring	Good parts of two defective planks spliced using channel section applied by riveting as reinforcing piece.	Smith shop equipment.
Plush, old car seat	Used to make cabin car cushions. Also for patching.	Usual upholstering shop equipment.
Refuse from reclaimed journal box packing or dope	Burn to reclaim small pieces of babbitt.	Improvised open air furnace with means for collecting melted soft metal.
Roofing, old car	Worked over to make buckets, oil cans, spouting, etc. Also to make tire shims.	Usual tinshop equipment.
Shovels, Scoops Ballast Forks	Cut off rivet heads, knock out rivets, equip-good blades with new or second-hand handles or apply D grips to handles where grip only is damaged. Dress blade if necessary and dip blade in paint.	Machinists' vise, hand hammer and chisels, punches, etc., small portable air or electric drill for drilling rivet holes in handle, small dipping vat.
Scrap coil springs (car)	Straighten and convert into bars of various kinds, drifts, nail pullers, slice bars, chisels for locomotive and cabin car equipment, etc.	Usual blacksmith shop equipment including oil furnace and power hammer.
Scrap coil springs (Brake Cylinder)	Worked over to make packing hooks, packing knives, etc.	Small oil furnace and power hammer.
Scrap eliptic spring steel	Made into Spring Clips, and Car Repair Wrenches.	Steam or drop hammer and dies.
Shavings	Sold or used to build fires in locomotives.	Some roads use baler to prepare shavings for convenient handling.
Scrap staybolts	Cleaned by rattling and used as follows: Piled with other iron and worked up into forgings. Tate flexible staybolts annealed, cut to shorter lengths and threads rechased. Radial staybolts cut down to make rigid staybolts. Crown bolts worked over to make patch bolts. Short staybolts worked over into rivets. Radial staybolts made over into studs.	Usual shop equipment.
Spikes, Track	Straighten spikes not cut under throat. Straighten and upset cut throat spikes.	For straightening only use quick action power hammer. For cut throat spikes straighten and upset in forging machine, first heating in oil furnace. There is a new machine on the market for straightening spikes by hand.
Scrap, wrought iron	Sheared, piled and worked up under steam hammer into blooms. Used for making locomotive forgings such as frame sections, slide rod ends, drawbars and drawbar pins, equalizers, knuckle joint pins, left shafts, spring hangers, crosshead arms, levers, brake rods, boiler valve stem crossheads, brake brace jaws and similar parts.	Heating furnace, steam hammer, drop hammer, dies, etc.
Old Paint Skims	Scraped out of barrels and other containers and boiled in a vat.	Boiling vat and furnace.
Scrap Tire Steel	Forged into follower plates.	Usual smith shop equipment. Power press for applying tip to body of tool. This may also be done with electric or acetylene welding equipment.
Scrap Tire Steel	Forged down to make lathe and other metal cutting tools when equipped with high speed steel tips.	Usual smith shop equipment,
Scrap Tire Steel	Forged to make such parts as clay and tamping pick ends, lining bars, pinch bars, blacksmith tools, spike mauls, claw bars and chisel bars for car work, the latter tipped with a short piece of tool steel.	Drop hammer, furnace, steam hammer, etc.
Scrap Tire Steel	Drop forged ball pien hammers and combination coal pick hammers made from this material.	
Scrap brass foundry sand	Washed to remove particles of brass and sold.	Centrifugal washing machine and settling tanks.
Sacks, cement	Cleaned in rotating rattler made of front end netting. This cleans sacks and reclaims cement.	Power driven enclosed rattler.
Scrap coupler yokes and arch bars	Worked over into passenger car safety chain hooks.	Steam or drop hammer and dies.
Scrap coupler yokes and arch bars	Made into coupler carrier irons.	Smith shop equipment.
Scrap coupler yokes and arch bars	Split, headed and rerolled.	Rerolling mill, special shears, oil furnace.
Scrap coupler yokes and arch bars	Cut to short lengths and used with other wrought iron scrap as piling iron and forged under steam hammer.	Heating furnace and steam hammer.
Switch points	Worn and broken points built up with acetylene torch and dressed with portable emery grinder.	Acetylene welding equipment, portable power driven grinder.
Switch points	Worn points swedged to standard height and redressed on planer.	Frog shop equipment, planers, steam hammer, furnaces, etc.
Switch slide plates	When bent should be heated and straightened.	Smith shop equipment.
Switch stands	Make standard repairs.	No special equipment.
Scrap boiler plate	Used to make ends for locomotive fire scrappers. Plate sheared to size, punched and rectangular hole and handle riveted on.	Usual blacksmith shop equipment.
Scrap boiler plate	Made into washers for crank, knuckle joint, and valve motion pins.	Steam or drop hammer with necessary dies.
Scrap boiler tubes	Cut to suitable lengths flatten at ends, and use to make pilot ribs. Tubes must first be rattled to remove scale. Old shop shapes tube on bulldozer to semi-circular section.	Usual shop equipment of rattler, shear and power hammer.
Scrap boiler tubes	Shear to suitable length and use for fence posts, the tube being punched for wire fencing.	Usual shop equipment.
Scrap boiler tubes	Cut to suitable lengths, flattened at ends, use to make slats for coke car gates.	Usual shop equipment.
Scrap boiler tubes	Flatten and cut into washers.	Steam or power hammer, washer machine.
Washers	Sort to size, return to stock. Some roads clean in rattler. This effectually removes rust and dirt and we believe is good practice.	Rattler, sorting table with necessary pockets, chutes and receptacles.
Scrap Shop Wood	Sold or cut up and used for firing up engines.	Wood splitting machine (home-made).
Tie Plates, old	Repunched for use under different rail, also heated and straightened.	Power punch, steam hammer and dies.
Truss rods, brake staffs, and other bar scrap	Heated and rerolled into smaller size stock.	Rerolling mill and oil furnace.
Truss rods, brake staffs, and other bar scrap	Cut to required lengths and made into bolts or other forgings for which suitable.	Shears bolt heading machinery, etc.
Wrenches, Alligator	Anneal, recut teeth and retemper.	Annealing and tempering furnace and usual tool room equipment.
Screw type wrenches	Repair by renewing damaged parts. So far as possible use parts reclaimed from discarded wrenches.	Ordinary hand and bench tools.
Cast iron wheels, slid flat	Ground to standard contour.	Wheel grinding machine.
Cast steel wheels, sharp flanges	Built up to contour by electric welder.	Electric welder.
Old cotton waste	Cleaned and returned to service.	Centrifugal washing machine, oven for drying.

of 1915. The proceedings of that year devoted practically 150 pages to it, and there is really nothing more to add to it with the exception that we have attempted to cover the operation of reclaiming, the principle involved showing the operation and the equipment necessary for such operation.

A. W. Hadley (N. Y., N. H. & H.): In reading over the pamphlet, I find that the larger part of it we are practically doing at our plant at the present time, and I was glad to see one thing in regard to manufacture. That is something that I feel that we ought to do more than we have in the past. There is one thing that the reclamation plants of all the roads are up against. That is in the other departments thinking that they cannot use our material because it has once been called scrap. But I think that has been overcome to a great extent because we have advanced so fast that they have come to find that the reclamation plant is the salvation when they cannot get material anywhere else.

C. D. Young (Pennsylvania): There is one thought that comes to my attention, and that is that we can go too far in attempting to make a showing on reclamation. I think reclamation ought to start at the source of the material when it is discarded or set aside for active application. There is entirely too much material coming to reclamation plants that should never arrive at that point. It ought to be picked out and set aside and used over again or repaired, and put back in service without going through the formalities of being reclaimed and thus handled two or thre times, and perhaps transported some number of miles.

There is a tendency, perhaps, in the store department—if you set up competition among your various divisions and your district storekeepers to make a good showing on reclamation—to transport materials to some central point, so as to get that material into their reclamation report, and I think that that should be carefully watched by the general supervision of the general storekeepers in order to prevent that practice. Reports and prepared forms for this kind of work should be guarded by close supervision to prevent having materials going through reclamation work, to have a showing on paper as to what you save. I thing the putting down of how much you have saved on some hypothetical figure either through present market value of new material or otherwise is a waste of time, and if the committee's report includes a suggestion for showing any money saving, I think that it is a loss of time and a waste of money to make long, laborious calculations as to how much you have saved, when the facts can be very readily stated by simply showing the transfer from scrap back into material accounts.

H. E. Ray (A., T. & S. F.): The question is so important that if you would cover it fully it would take considerable time.

I am in favor of the report as it stands. We on the Santa Fe have done a good bit of reclamation work. We tried to reclaim only what was worth reclaiming. We safeguarded ourselves against making paper records. All those are matters of detail that have to be worked out. It is a common-sense proposition, the same as any other store department job. A great deal depends on the character and the type of men that are put in charge of it. Very much depends on the co-operation you get from the operating and mechanical people. Very much, indeed, depends on the backing and support you get from the management. All that sort of things are fundamentals that go to make up a successful reclamation plant. It is a question that takes a lot of study, and most of you will have to work out your own plan, depending on your local conditions. It is simply a question of common-sense handling, good business judgment and proper organization and the proper backing.

U. K. Hall (U. P.): There is no subject that is more important to our roads than reclamation. There is no phase of our work that we can slip over, and fool ourselves on easier than we can on reclamation. The committee has provided a blank so that each operation can be watched to see whether or not it pays. We can lose money on reclamation, and fool ourselves into thinking we are making a big saving. I do not think there is any safeguard that we can throw upon this operation in the matter of accounts that is wasted. We might just as well say that as long as John Wanamaker had plenty of money to pay his bills, he would not need to keep books. He knew he made money because he had it. I do not think, as an Association, we should for one minute countenance any lack of records or any let up in the dollar and cents proposition of our reclamation because it must be watched closely. There is tremendous profit and there is liability of a tremendous loss, and I feel the matter of records is just as important to us as it is to any merchant in the country.

J. G. Stuart (C. B. & Q.): Some reference has been made to tonnage basis. There must be no tonnage basis in it at all. It must be individual items, and you must get individual cost on each individual item. You may save good money on 15 items and lose good money on the sixteenth, and if you attempt to lump them together you are simply reclaiming something that you are reclaiming at a loss. I agree with Mr. Hall that we do want records—not necessarily long, extended records—but we do want complete and full records of each item we are claiming until we have reached the stage where we are entirely satisfied that it does pay us to reclaim that individual item.

C. D. Young (Pennsylvania): The word "tonnage basis" was probably used a little unfortunately and too broadly. You must analyze your individual item, and see that you have accomplished something by reclamation. In stores departments a great many operations are theoretical savings, because you must take the figure between what it has cost, and something else, and that something else is a very difficult thing to define, whether it shall be a loss price or an average price, or 80 or 75 per cent of the new value. From my point of view, I do not see anything to be gained by the application of your cost to some other figure. We should know definitely what we are doing with each item before we go into it and spend labor on the material to put it back in stock.

A motion that the report as read be adopted was carried.

Report of Committee on Stationery

THE COMMITTEE unanimously recommends that the purchasing of stationery and printing (to include all stationery forms and supplies, tariffs, tickets and mechanical appliances used in connection with clerical work) shall be made by the purchasing department with their regular machinery, and that the principle of competitive bidding on standard forms and stationery supplies be maintained.

Contracting for Standard Forms

All standard forms should be contracted for in quantities as large as the requirements will warrant; the reason being that through this method the best prices are obtainable, as it gives the printers an opportunity to set up their forms and print at a time most convenient to them.

It enables the stock to be kept at a minimum by saving the time required to solicit fresh bids and all clerical work incidental thereto.

The contracts should be made so that the storekeeper will only order in such quantities as required, and his storage facilities will permit.

Grouping of similar forms under one contract is desired for the purpose of obtaining the lowest price, uniform quality and workmanship.

Stationery and Printing Committee

All railroads should have a stationery and printing committee composed of a member of the purchasing department and representatives of using departments. The decisions of this committee shall be recorded in stock books of the stores department. The committee should have as its chairman a direct representative of the chief executive officer.

No changes in existing forms or no new forms shall be introduced without the approval of this committee. They should

insist on a clear and correct copy for all printed matter to avoid waste of money in altering proofs.

This committee shall determine the quality of paper and size to be used for all forms. They shall also designate the kinds and quality of all standard stationery and office supplies and mechanical appliances.

General Recommendations

Every railroad should have sufficient equipment to take care of its emergency printing and such standard forms as can be printed most economically. The committee desires to call particular attention to the advantage of the contract method of purchasing stationery and printing, and that the contract period should not exceed one year, this method of buying having advantages of not only assuring the lowest prices and uniform quality, but the very important item of stock control, in that it saves time.

Attention is called to the importance of delegating, to the stationer or storekeeper, authority to curtail requisitions no matter by whom approved. It is believed that the stationer or storekeeper has the only reliable data to intelligently check requisitions, and by reason of his experience and undivided attention is in the best position of any official on the railroad to determine generally the quantity of stationery required.

The report is signed by W. D. Stokes (Chairman) I. C.; W. J. Hiner, C., C., C. & St. L.; W. G. Burrell, G. G., and H. C. Pearce (Chairman Ex-Officio), S. A. L.

Discussion

G. W. Snyder (Pennsylvania): I notice in the report under the heading of Storage "Every item of stationery shall have an identification number." We are using for correspondence within the organization blank sheets 8 in. x 10½ in. to write letters on. Is it the idea of the committee that perfectly blank sheets of paper shall have identification numbers?

Mr. Burrell: The idea of the committee on that point was that every item should have some distinguishing number, not printed, not stamped necessarily, but something that it can be known by in the catalog, so that you will know it under a certain number. Now, your blank paper might come under P-5, or something of that kind, carbon paper of a certain size and quality would come under a specification number. On the Grand Trunk we call it under P-38, which means it is a certain sized carbon paper of a certain quality.

Mr. Stokes: That paragraph was put in to meet normal conditions.

Mr. Davidson: I think that ought to go in. I think this is a little too technical.

Mr. Stokes: I see no objection to that.

H. H. Laughton (Southern): I think that the report made by the committee is excellent. I do not think that we should eliminate one line. We have a stationer, and we have confidence in him. Let him cut the requisition and then take it up and apologize afterwards. That is what I have got a stationer for, to cut requisitions, and that is what we expect the division storekeepers to do. Now, let us take no authority away from him. Let us extend it.

H. B. Hodges (Pennsylvania): I do not agree that the stationer should have the authority to cut down requisitions which have been approved by the general manager. If the stationer feels that an unnecessarily large amount is required, he should take the matter up with the general manager, and get full authority, but it might complicate matters very much if the stationer would have that authority for the reason that for some motive unknown to the stationer there may have been a large amount required. He does not know what is going on in the mind of the general manager, and I certainly object to giving the stationer authority. I do not think any storekeeper should have authority to cut down requisitions approved by the general manager.

M. E. Towner (W. M.): There is a principle involved in this entire question. You must have authority, and when you appoint a stationer and he is the right man, he should have authority to do the right thing, and one of the right things to do is not to issue too much stationery. If his records are correct, he will not issue too much stationery, whether the requisition calls for it or not. I remember very well when Frank Stokes was stationer on the New Haven Railroad and Frank said to me: "I am cutting requisitions in two, I am saving fifty per cent." But he did not get onto the fact that the officers were asking for twice as much as they needed and he did not have the proper records from which he could get at that fact. The management of any railroad will help any one that is trying to keep down their expenses. That is what it means. You have got to give your stationers authority. Our stationer has it on the Western Maryland, and we get splendid results.

G. W. Snyder (Pennsylvania): This proposition distinctly says the stationer shall have the authority to cut our requisitions at his discretion. No such proposition will ever get by on the Pennsylvania Railroad. You are going to be the judge of how much stationery you need, in the last analysis, and I am going to be the judge of how much stationery I need in the last analysis. There is no disposition whatever to restrict the stationer in questioning the propriety of any requisition he gets, but the judge of the thing in its last analysis is the officer who is responsible for the requisition. Now, you propose to give this stationer authority, you propose to tell him where he will get off. No such Bolshevistic scheme will ever prevail on the Pennsylvania Railroad. *A motion to adopt this report as submitted was seconded and carried.*

Report of Committee on Classification of Material

THE COMMITTEE on Classification of Material sent out an inquiry to one hundred or more roads asking for any important changes that should be made in the Material Classification of the Railway Storekeepers' Association, and which was adopted by the United States Railroad Administration, and to this inquiry received fifty replies, which, briefly summarized, are as follows:

Classification not used	13
Satisfactory as at present	9
Not thought satisfactory for use	2
Various changes recommended	13
No change to recommend at present	20
Objected to division by departments	3
Too much detail to get desired results	2
Cost too much to produce accurate results	1
Should have less classes and be same as sectional arrangement of material	1
Should be no symbols as 1-A, 1-B, etc	1
Book of material alphabetically arranged by classes should be revised adding new items used since list was prepared	1

As it develops so few roads have been using the present classification up to the time it was adopted by the U. S. R. A., and not having had sufficient experience in handling same from an ordering, disbursing and accounting standpoint, also that those who recently adopted it have incurred more or less expense in rearranging material to conform, in addition to expense of printing forms, etc., the committee recommends that the present classification, which is quite complete and should meet the demand of most roads, be continued as it reads for at least another year, giving it a fair trial, developing changes which are of consequence and which when altered will result beneficially to the roads using it.

The report is signed by: C. H. Rost, C. R. I. & P., chairman; F. H. Fechtig, A. C. L.; H. P. McQuilkin, B. & O.; W. S. Moorehead, I. C.; G. T. Dunn, M. C.

Discussion

Mr. Reid (B. & O.): I would like to hear from someone who has had experience with this classification: what their experience is with their inventory. Whether they find very great discrepancies. That is quite an elaborate classificaton, and it offers a good many opportunities for errors in accounting. Of course, any records or information that is

not correct merely misleads. It is worse than no information at all. I would like to know the experience of someone who has been operating it for some time.

A. R. Dale: My experience with it has been that where we have had deficiency, or shortages, or alterages, the classification tends to point out where the trouble is.

Mr. Reid: The classification would not be responsible for that. It would be the application of it, the same as taking stock, rendering your stock book or anything else. We have used that ever since it has been adopted by the Storekeepers Assn., and I believe that was 10 years ago. We used it successfully when some of our classes needed looking up, and we saw what was wrong.

A motion to accept this report was carried.

Report of Committee on Fuel

IN CONNECTION WITH THE REPORT on Subject 9—Fuel, it developed that the general committee has not seen this report nor taken action on it.

As under the rules it should first come before the general committee, and then be referred to the open meeting, *a motion that the report of the committee be referred back to the general committee for such action as they deemed proper, was carried.*

Report of Committee on Scrap Classification, Handling and Sales

THE COMMITTEE recommends the use of the following form in connection with the sale of scrap.

Terms of Sale: Please quote on this sheet price per unit specified on the following scrap materials. This scrap will be sold f. o. b. any point on our lines. Show in your bid tonnage and delivery point desired.

Sealed bids for this scrap to receive consideration must be in this office by 12 o'clock noon on.....

Envelopes containing bids should be marked in the lower left hand corner "bid on scrap," and no change in your quotation will be permitted after that time.

The right to accept or reject part or all of your bid is reserved. If accepted, the following terms and conditions will govern, and will be made a part of the transaction.

Shipment: Final shipping directions must be furnished within ten (10) days from date of award. When shipping directions for material are not furnished within ten (10) days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.

Shipment will ordinarily be made within thirty (30) days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within sixty (60) days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within ten days thereafter.

Current tariff switching charges will be made for delivery to connecting lines.

Terms: Sight draft attached to bill of lading, or certified check before car is delivered. Our classification and track scale weights at point of loading to govern.

Please send your shipping directions to conform with above terms of sale.

The report is signed by G. W. Hayden (Chairman), N. Y., N. H. & H.; J. C. Kirk, C., R. I. & P.; J. R. Haynes, C., B. & Q.; I. B. Thomas, Pennsylvania; W. F. Jones, N. Y. C., and A. W. Munster (Chairman Ex-Officio), B. & M.

Discussion

Wm. Davidson (I. C.): I presume everyone in this convention realizes that this is a pretty important paper. I was on the Scrap Committee two or three sessions, and one of the points we made was that we could not do very much changing the classifications, we found it was pretty satisfactory to the railroads.

I have taken the opportunity of discussing freely with the scrap dealers, and I found out that the scrap classification adopted by the R. S. A. in many cases was not satisfactory to the scrap dealers.

G. G. Yeomans (N. Y. N. H. & H.): There seems to be some doubt in Mr. Burr's (Erie) mind regarding the legality of optional cancelation at the end of sixty days if shipment is prevented by causes beyond our control. I think such a doubt as that can be dispelled immediately. Anything is legal which is agreed to before the transaction is completed. It becomes a part of the transaction itself, and there is no question then whatever as to its legality or illegality. I think the report is an admirable one, and I have studied over these terms pretty carefully. I do not believe that the interests of the railroad companies in disposing of their scrap can be any better safeguarded than they are safeguarded by the rules that this committee has proposed.

The Chairman: Please confine remarks to the 60-day provision. Is there any one else in the house excepting Mr. Burr or his purchasing department who has any objection to this one?

H. B. Hodges (Pennsylvania): My objection to 60 days is that in many cases the scrap dealer makes a purchase with some definite idea as to its disposal. He wants to ship it abroad, maybe, or have some other customers who will require the material right away. I think putting in that clause is an unnecessary hardship on the scrap dealer. It is my idea that it will prevent many scrap dealers from making disposals.

C. D. Young (Pennsylvania): I suggest that we take up the report item by item. If there are objections, we will note them, and if they are acceptable we can pass them. I have quite a number of items that I would like to suggest—they are all matters of detail.

It was regularly moved, seconded and carried, that the members so desiring retire with the committee to the Marlborough-Blenheim Committee room, and prepare written criticisms on this report and present it back to the meeting at 2.30 o'clock.

Report on Purchasing, Storage and Distribution of Ice

THE SUBJECT of the purchase, storage and distribution of ice involves two main questions, (1) The requirements of the railroads and the source of supply; (2) Practices, methods and facilities employed in caring for and handling the supply. The subject is accordingly treated from the standpoint of these two questions.

The matter presented is based mainly on information obtained from railroads and other large consumers and from manufacturers and dealers of ice throughout the country through means of questionnaires.

The Requirements of the Railroads and the Sources of Supply

It is estimated that in all services the railways of the country consume annually in the neighborhood of six million tons of ice. The importance of the purposes served and the peculiar

nature of the commodity handled makes the subject one of considerable interest.

The figures gathered indicate that the ice used is about evenly divided as between natural and artificial. The railroads store annually in the neighborhood of 2,500,000 tons of natural ice. They manufacture in the neighborhood of 100,000 tons of artificial ice. The balance of the requirements, natural and artificial, practically 55 per cent. of the total, is delivered from the storage houses and manufacturing plants of dealers.

Location is the principal factor that controls the method of obtaining the supply. Several of the railroads in the North do their own harvesting, but in the majority of the cases the ice is harvested and shipped by people engaged in the business and the railroads store the ice themselves. The railroads do not seem to have entered into the manufacture of ice to any material extent. The Santa Fe operates two plants and a few other roads manufacture in small quantities.

The supply of ice is generally contracted for from season to season. Some long-time contracts have been made as an inducement to dealers to erect artificial ice plants.

The consumption of ice has been increasing at a very rapid rate, and the present sources of supply as well as the facilities for taking care of the ice are overtaxed.

This state of affairs has been brought about mainly through the increase in the transportation of perishable products. It is estimated that in ten years this business of shipping perishable products under refrigeration has at least doubled. There is not only the volume of it to be considered, but in general the freight is hauled long distances and consequently requires a great deal of ice to insure its safe carriage.

As this business will undoubtedly continue to grow, provisions must be made to meet the increased demand for ice. The ideal plan would seem to be to develop some portable means of producing the refrigeration required. Some attempts have been made along this line and this is encouraging.

Railroads in the North, able unfailingly to obtain an unlimited supply of good natural ice, will probably continue the present method. Their problem is merely one of expansion of storage and icing facilities. For the railroads in the Southern sections the problem is definitely one of developing the sources of supply for artificial ice. For the railroads in the Middle section depending at present largely on natural ice, the problem is more complex. Let us, therefore, consider their situation.

While many of these railroads usually have regular sources to draw from, the irregularity of weather conditions cause them to shift from source to source.

Another thing to be taken into account in the case of railroads obliged to ship their ice from distant points, is the element of transportation. The gathering of the ice occurs at a time of the year when there is a scarcity of equipment and labor. When we take into account the general interference with traffic conditions and the inconvenience to and displacement of earning traffic which it causes, we are led to question whether it is not a pretty expensive way of providing the ice supply. It would seem that the more dependable and perhaps more economical method in many cases will be to develop production of artificial ice. The demand for artificial ice to meet the requirements of the railroads will become very great. Provided the railroads are able to obtain the ice from manufacturers at about what it would cost themselves to make it, it will not be desirable for them to enter into the ice manufacturing business. Quantity has a great deal to do with the cost of making ice and by combining the needs of the railroads, which are usually large, with the general commercial demand the manufacturer can obtain the benefit of quantity output. The ice manufacturer occasionally adds the cold storage business to his ice business which further helps him in obtaining the maximum output of his plant. This combination of benefits available to the commercial plant from sale of storage and ice should put the commercial plant in position to furnish the ice to the railroads at a price that would be attractive.

There will, of course, be exceptional cases where requirements of a railroad or a group of railroads combined are of such magnitude as to make it desirable to confine the output of the plant strictly to the uses of the railroads.

Practices, Methods and Facilities Employed in Caring for and Handling the Supply

The questionnaire sent out to the railroads and dealers contained this query: "What is the approximate shrinkage loss?" The answers ranged from 1 per cent to 40 per cent. While it is not possible to do away with shrinkage altogether, there is a minimum to which it can be reduced. The elements which control it are climate, methods of harvesting, distance transported, housing and protection.

Harvesting.—A great deal of the so-called shrinkage in ice is the result of not properly removing the soft ice in the field, the breakage in loading and unloading and the delay in handling the cars from the ice field to the ice house. In other words, a good share of the loss occurs before the ice is ever put into the ice house.*

Considerable difference of opinion seems to exist as to the size to which ice should be cut. As to thickness, the consensus of opinion seems to be that ice should be 10 in. to 16 in. Weather conditions and prospects for the ice crop govern this. It is sometimes wise to start harvesting when the ice is 8 in. thick. As to horizontal dimensions, different localities seem to have their preference. Along the Hudson the size of cake is 22 in. by 32 in. In the Northwest it is 22 in. by 22 in. Some of the packers cut their ice 22 in. by 44 in. with a seam which permits of splitting cakes when removing from the house. For artificial ice the 300-lb. cake seems to be the one generally preferred. Commercial custom and facilities for handling govern this.

The committee recommends that:

1. Attention should be given to sanitation in locating the field.
2. Particular care must be given to planing. All snow, slush and dirt should be removed.
3. The minimum thickness of natural ice should be 10 in.

Storage Houses.—Storage buildings may be divided as to purpose into three general classes, *i. e.*, combination storage and icing plants, general storage buildings and service buildings.

Ice house construction is, of course, a matter of engineering and we shall not attempt to go into it in detail.

The size of the compartments in which ice is stored should be limited in order to avoid having more ice exposed than is necessary while the ice is being removed from the building. This is regulated by the rapidity with which the ice is required for use.

The floors of ice chambers should incline slightly toward the center so as to avoid the danger of throwing the pressure of the contents on the walls, and to assist drainage.

Storage houses must be well drained and drains must be trapped in such a way as to prevent admission of air to the ice chamber.

There should be a loft over the ice chamber which should be well ventilated and the floor of this loft should be covered by a thick layer of insulating material.

Insulation is one of the important features of ice-house construction. It is reported that in a completely insulated house the season shrinkage is 8 per cent, while in a poorly insulated house the shrinkage is from 30 per cent to 40 per cent. It seems to be the opinion that the dead air spaces in walls have not very much insulating value. It is admitted that air is a good insulator provided it can be prevented from circulating. It is explained, however, that air currents are set up and the air instead of acting as a bar to the transmission of heat acts as a conveyor of heat.

Storing.—There is a good deal of difference of opinion as to whether the ice should be placed flat or on edge and whether joints should be butted together, separated or broken. The packers and dealers all favor laying the cakes flat with spaces of from two to three inches between the tiers in one direction, the top two or three layers to be closed tight. By laying the ice closely with broken joints or with butted joints a larger amount can be stored and as this way of laying excludes the air, it is likely that the shrinkage will be less. Broken joints also avoid the danger of the ice

* Get the pamphlet "How to Harvest Ice," by Gifford Wood Co., Hudson, N. Y.

slipping and forcing the walls. The objection to that plan is that the cakes freeze together and they cannot be removed without considerable breakage and excess labor. Storing the ice on edge or alternately edge and flat permits of removal in good shape, but it is said to require more time and labor in storing. There is a majority among the large users of all classes in favor of laying the ice flat with the edges apart in one direction. It is claimed that the better condition in which the ice can be removed from the ice house justifies this practice. Copies of instructions in force on the C. B. & Q. Railroad describing their method of storing ice will be of interest.

The larger users say that it is not necessary to put any covering on ice stored in completely insulated houses. Where ice is stored in ordinary storage buildings it is recommended that it be covered with hay or straw. It is stated that one ton of dry hay should be used to every 600 square feet of space. They also recommend a covering of heavy insulating paper laid over the hay. In full insulated houses the ice may be placed against the walls. In the ordinary type of house the ice should be kept away from the wall at least 8 in. and a packing of sawdust should be maintained between the ice and the walls.

Ice stored in connection with ice manufacturing plants is kept under refrigeration and shrinkage loss is practically eliminated.

The Missouri Pacific have installed refrigerating equipment in connection with some of their ice houses. This enables them to fill their ice houses with either natural or artificial ice. If the natural crop fails they purchase the surplus output of neighboring dealers and store it for use during the icing season. The equipment consists of a motor, ammonia compressor and piping. A plant installed in 1915 cost $8,500. It is estimated that it costs 50 cents per ton per year to maintain the required temperature in the storage house.

Inquiry was made of the outside users and dealers as to the practicability of storing manufactured ice without refrigeration. With one exception the answers were opposed to it. The one exception was one of the largest ice dealers in the country. They referred the matter to their Chief Refrigerating Engineer and we quote his statement:

"We stored fifteen hundred tons of artificial ice in a natural house last year in the following manner:

"We spaced the ice with spacing strips both ways and put water-proof paper between each tier to prevent the cakes freezing together. This ice was put in in April during rainy weather and when the temperature was really too high for storing ice properly and taken out in the latter part of June. Our actual shrinkage was 19 per cent. I am satisfied if ice were put in during cold weather the shrinkage would not exceed 15 per cent."

The committee recommends that:

1. Ice should be placed flat with 1½ in. spaces between tiers in one direction, except the three top tiers, which should be laid with broken joints and edges butted together.

2. Covering may be omitted in fully insulated houses. In houses not so insulated a suitable covering of hay should be laid on the ice and the ice should be laid not less than 8 in. away from outer walls, the spaces between the outer walls and the ice to be packed with sawdust or shavings as the ice is put in.

3. Consideration should be given to the installation of ice machinery for the purpose of producing refrigeration to protect ice in storage (either natural or artificial), and such equipment should be installed where the condition will justify.

4. Artificial ice should not be stored without refrigeration, except in emergency cases.

Reference to the question of fire protection should not be omitted. Attention should be given to the following requirements:

1. Proper equipment of hydrants, hose, water barrels, buckets and extinguishers as the character of the building and surrounding conditions may warrant.

2. Lighting and wiring should be installed according to approved practices.

3. Prohibition of the use of torches and smoking on the premises.

4. Keeping premises clean and free from inflammable materials of all kinds.

5. Inspection at frequent intervals.

Icing Cars.—About 40 per cent. of the ice purchased by railroads is used for the protection of perishable products. The Federal Ice Refrigerating Company erected a plant at Blue Island, Chicago, about a year ago with a manufacturing capacity of 700 tons per day. This plant is equipped to ice 40 cars at a setting, twenty on each side of the icing platform. The time required for icing is one minute per car. The Burlington has a modern plant at Galesburg with a capacity for icing 30 cars at one time. It is equipped with platforms at two levels, the lower one level with the car roof used for cake icing and by the men in salting and tamping the bunkers. Crushed ice is delivered to the bunkers from the upper level through chutes operated on carriers.

A great deal of icing is done on the team tracks in the larger terminals. The latest thing for this purpose is a special ice bed and frame which may be mounted on the chassis of a motor truck. The truck is drawn up along side of the car by four spiral columns operated on the principle of the screw jack, the power being taken from the motor of the truck. There is a side opening in the ice bed from which the ice is shunted into the bunker of the car.

Transferring.—Storage houses should as far as possible be located so as to reduce this transferring to the minimum.

On account of limited storage supply at certain points it is sometimes necessary to transfer ice from reserve storage houses. In these cases it is best to arrange the transfer as far as practicable so that it will be made during the cooler months, leaving the ice in the local storage undisturbed until the warm weather sets in. Refrigerators should be used for transferring ice when available.

Ice for outlying stations and maintenance of way gangs is supplied in some cases by shipment from division points in baggage cars, the ice being packed in ice boxes or sacks. A better plan, however, seems to be to purchase the ice from the local dealers whenever this can be done.

Accounting.—A very large part of the ice purchased is used in the protection of perishable products and in many cases this ice is chargeable to the shipper as a part of the charge for protective service.

One of the first things in connection with accounting is to require detailed accounts of the cost of the ice. The next thing is to require that the ice be charged out as used on an approximately accurate basis and not on any arbitrary basis. Unless an accurate account is kept of the ice disbursed the shrinkage cannot be determined.

After the cost of the ice is ascertained the shrinkage should be estimated based on past experience and the anticipated shrinkage should be taken care of in the price of the ice. Differences should be adjusted at inventory time or at the end of the season.

We are informed by the Committee on Perishable Freight, Section IV, that it is endeavoring in connection with the Interstate Commerce Commission to work up a set of uniform reports.

The committee recommends that:

1. A ledger account should be kept of each ice house and the account should be debited with the cost of ice, freight, labor and incidental expenses.

2. Cost should be calculated as soon as the storage has been completed and the price to be charged for the ice used from that house during the season established. The price should cover the estimated shrinkage.

3. Requisitions should be required for ice used and the actual amount used as nearly as it can reasonably be ascertained should be charged.

4. Monthly inventory should be taken for stock purposes and as a check against unusual meltage.

5. Inventory should be taken at the end of the season, the account balanced and the overage or shortage adjusted, or this may be done at the regular inventory time.

Supervision.—Centralized responsibility for the handling of this matter in all its phases is essential to satisfactory results. The particular department that is made responsible is not so important as it is that such centralized control be provided. The committee recommends, however, that the purchase of ice be in the hands of the purchasing agent and the care and handling in the hands of the general storekeeper.

The report is signed by: T. J. Frier (chairman), Wabash; T. W. Flannagan, M. St. P. & S. S. M.; O. C. Wakefield, Nor. Pac., and G. E. Scott, M. K. & T.

Discussion

T. J. Frier (Wab.): The committee concluded to deal with the subject under two general heads. One, the requirements of the railroads and the sources of supply; the other practices, methods and facilities employed in caring for and handling the supply. Under the first question—the requirements of the railroads and sources of supply—the committee has attempted to give the members general information which would seem to be of interest. The report points out the growing magnitude of the ice supply and the importance of it. The growth in the use of perishable products is having quite an effect on the ice business, and it has overtaxed the facilities, and is changing the practice on a number of railroads as to the method of obtaining the supply. Under the range of conditions, however, that obtained, they are so great that it is impossible to make definite recommendations under this head. Each case of each railroad must be determined by the application of business judgment in the particular case.

Under the second question—the practice, method and facilities employed in caring for and handling ice—the committee has attempted to give the members the benefit of the experience of the largest users and dealers, both in railroads and commercial fields on the different important phases of the question. The report under this head deals with the harvesting, distribution of ice houses, methods of storing, disbursing, accounting and supervision; under each of these various heads is submitted recommendations which are justified by the concensus of opinion of those who should be best informed to give imformation on the subject.

The last part of the report contains the summary and recommendations which the committee thought proper to submit.

A motion that the report as presented by the committee be adopted was seconded and carried.

Report of Committee on Purchasing Agent's Office Records

THE FOLLOWING is a brief description of some of the forms recommended by this committee:

Form No. 12-2 (a)—Price Record card form size 5 by 8, should be kept for a permanent record of current prices on miscellaneous material not covered by contract. This does not include machinery, tools and such special items. When current prices are received they are first entered in the permanent price column in typewriter or ink, after which enter them in present price column in pencil so they may be erased when changed. Double spacing is provided for the purpose of entering the date on the top line and the price on the bottom line.

Form No. 12-3—Price Inquiry Form—Size, 8 by 10½, or 8½ by 11.

Two copies are to be sent out for quotations—one copy to be returned, the other to be retained by the bidder.

Form No. 12-5-1—Invoice Record—This form is for a record of invoices in the purchasing agents' office, and will show the purchases from each concern; also will give a complete history of each invoice. By the use of this record, the purchasing agent may determine at all times the number of unpaid bills.

Form No. 12-7 Record of purchases taken from invoices. Size 14 by 17. This form will give a complete record of material by commodities that may be necessary to keep record of, and the sheets may be filed alphabetically, according to material or classification number.

The report is signed by C. E. Walsh (Chairman), Pennsylvania; W. C. Bower, N. Y. C.; A. H. Lillengren, G. N.; C. R. Craig, Southern; E. G. Walker, A., T. & S. F.; E. Langham, Can. Nor.; J. F. Marshall, C. & A., and W. G. Phelps (chairman Ex-Officio), Pennsylvania.

Discussion

In connection with this report Chairman Pearce said: I heard outside that the purchasing agents felt yesterday that the discussion was very largely confined to store matters. Now, here is an opportunity for them to discuss a purchasing matter—an intensely personal one to every purchasing officer.

C. E. Walsh (Pennsylvania): The samples, as described in the report, do not give a very good idea of just what they are, and for that reason we have with us copies of the forms as recommended. We did not make any comment on the weight or quality of paper. We thought that should be left with the purchasing agent or railroad interested.

W. L. Lefaivere (D. & R. G.): The report speaks for itself, it is comprehensive. It depends entirely on your office force as to how your records are kept. If you are working for some road that has considerable money, you have considerable help.

If you are working for a road that is poor, you have a smaller amount of help. Unfortunately we have not the help that we would like to have, but our records are kept in such shape that we are able to present a statement at any period to our management. I believe the report has covered quite a comprehensive field. We are not able to adopt and put into effect all the conditions as outlined, but I would recommend very strongly its adoption. We are trying to work to that end ourselves by having an additional force added to our present forces.

The committee is to be congratulated on the amount of the work and the quality of the work that it has done in framing this report; in reading it over very carefully there is only one question that occurred to me that I would like to have the chairman of the committee answer, and that is, "What, if any, provision has been made in the records of the purchasing department to determine when any particular order or any particular requisition has been filled and completed. I did not see that covered by any exhibits or forms.

C. E. Walsh: We did not touch on that, because we expected to take up the form of requisition. We had it under consideration, and at the time we considered the form of requisition it was our idea to go into the practice and the handling of the requisition in the purchasing agent's office, but we felt that the requisition form was really a stores department form, the purchasing agent being only interested in the first copy, where they use four or five sheets. This is just a partial report, the committee were anxious to find out and get some idea as to what the general committee and the section would do with this report before it proceeded further.

A motion that the partial report of the committee be adopted, and the committee continue to complete its investigations and make a report at the next convention was carried.

Report of Committee on Lumber

THE COMMITTEE recommend the following:

1. The precise grade required should be specified in every instance. Terms such as best, No. 1, good, clear, etc., should be avoided except as contained in specifications generally known in the trade and therein designated.

Specifications should be, insofar as possible, commercial, and should be drawn from the printed booklets of the several lumber associations.

Special railroad specifications should be used only where commercial specifications will not answer or do not exist, and in the event of their use should be definitely designated that there may be no misunderstanding as to which specification is intended.

2. Bidders should be listed as to classes of lumber handled, and within each material class should be included all reliable dealers. The purchasing officer should familiarize himself with

the facilities of the prospective shipper before placing the order, and should, where he can, investigate the conditions which exist at the points of production.

3. Bids should be obtained to cover all purchases. All reliable dealers should have a chance at the business.

4. Preferably bids should be received sealed, and opened in concert by two responsible employes at the time set for that purpose in the tender.

5. These bids should be tabulated promptly, and the practice of holding schedules open beyond the days specified should be discouraged. The delivery price of the material should be calculated by considering the freight rates in connection with the estimated weight of the commodity, and, other factors being equal, business should be awarded to the lowest responsible bidder.

6. Opportunity should not be afforded any bidder to change his figures after the bids have been opened.

7. Inspection should be performed by a competent force of men, carefully trained, constantly supervised, and responsible alone to a designated general officer, and in no case to the consignee.

8. Inspection should, insofar as consistent with trade practices and possibilities, be performed at point of shipment, the materials there to be branded by means of a stamping hammer carried only by the railroad's inspector and difficult, if not impossible, of imitation. The use of crayons or paint should be prohibited.

9. Where material is of necessity shipped through to destination for inspection, it should be inspected in accordance with paragraph 7, and in no case by the consignee. To insure this, the consignee should be required to report to the general officer in charge of inspectors any incoming car which contains lumber not bearing the inspector's hammer brand. Such general officer should at intervals institute an independent check of incoming lumber.

10. Purchasing agent's order should state, where shipments are made subject to inspection at destination—(1) That rejects will be held not more than 30 days subject to shipper's disposition, after which the railroad will not be responsible, the 30 days to date from date of such rejection notice to shipper. (2) That freight, storage and handling chargeable to rejects must be paid by the shipper.

11. Consignees should acquaint the purchasing agent with each rejection very promptly, in order that he may notify the shipper within ten days of the time of the actual rejection.

12. A definite order directing what disposition should be made of the material will be received from the purchasing agent in each instance of rejection. The material may not be disposed of in any way except as directed by this order.

13. Should the disposition order not be received at destination within 60 days of the date of rejection, notice should be sent to the purchasing agent that the material is still on hand, and request for disposition should be traced.

14. In the event of disposition of rejected material, either by reshipment, destruction or sale, freight charges at commercial rates to destination, and storage and handling charges must be assessed against the shipper.

15. The railroad should not feel obligated to buy rejected lumber, in order to relieve the shipper of all or any part of these charges. In case such a purchase is made, the allowance should not exceed 15 per cent to 20 per cent of the invoiced price paid, based on mill delivery.

16. Rejected lumber should be given the same protection as accepted lumber; should be piled separately, and at least one piece in each lot should bear a tag showing: Car initial and number, name of shipper, date of receipt, and where possible, order number and bill number.

The report is signed by Wm. Beatty (Chairman), Pennsylvania; J. A. Laughlin, N. Y. C.; C. O. Deabler, M. P.; Howard Hayes, G. N.; F. W. Taylor, S. P.; M. E. Towner, W. M.; C. M. Smith, N. Y. C., and E. W. Thornley (Chairman Ex-Officio), B. & O.

Discussion

William Beatty (Pennsylvania): The first principle back of the preparation of this report was that we made it short with the hope that you would read it. There are, so far as we know, no experiments in this report. There may be some practices recommended which are novel to some of the members, but every recommendation is not only the unanimous thought of the committee but the result of actual experience, either with one road or several.

F. H. Fechtig (A. C. L.): The conditions on the A. C. L. with reference to lumber are not the same that you gentlemen have to deal with who deal with the middleman in a large number of cases. We go direct to the mill and therefore have been able to get our lumber anywhere from $20 to $30 lower than they get it in the North. I have read this report very carefully, and I am sure these gentlemen have given a great deal of thought to it and I recommend its adoption.

T. J. Frier (Wabash): In articles 5 and 6 of the report we are directed to provide that the practice of holding schedules open beyond the date specified should be discouraged and opportunity should not be afforded any bidder to change his figure. I think those are matters of a business judgment. If a buyer believes that the market is on a decline when he has an inquiry out, I see no reason why he should not defer awarding the business. I do not believe that we are justified in tying ourselves up too much by rigid regulations or business methods.

Wm. Beatty: With regard to point 6, that an opportunity should not be afforded any bidder to change his figure after bids had been opened. I find that if a lumber bidder has the impression that he will be called in and asked to revise his figures, his first tendency is to bid high enough to allow room to shade, and we believe that the best way to buy lumber is to give a fair and open opportunity to everybody to bid, and to have it generally known that there would be only a fair opportunity given, so that bidders at a distance may be afforded the same opportunity and have a fair chance at the business as people further away from them. There are, of course, certain circumstances which render inspection at the point of shipment impractical. You cannot very well inspect at the point of shipment material which is tied up in bundles, such as maple flooring or car siding or roofing or materials of that general character. You can inspect practically everything else.

If you have a force available or if your neighbors and friends will loan you a force—as an illustration—I cite the Pennsylvania. We co-operate very largely with our Baltimore & Ohio friends in inspecting. They have forces in certain territories where we do not have forces, and in certain territories they do not have any. We interchange. Also where we buy material out of our territory, as in the case of woods from the Pacific Coast, we ask our friends there if they will inspect for us.

F. D. Reed (C. R. I. & P.): The question of inspecting lumber is a very important one and can be handled in different ways, but the method should be governed by a great extent from the party whom you purchase it. It is the practice on the Rock Island to buy lumber not from dealers but direct from manufacturers. In that way we buy it first-handed and we arrange for the purchase of material of specified grades, and it permits us to make inspection at destination. We can do that for the reason that the manufacturers in all instances know exactly what material is wanted. They know the grades and they make every effort to please the customer.

I think all of us ought to give more attention to the question of buying lumber from manufacturers direct. It is important. You can specify what you want and cut out the middleman, or the irresponsible dealer, and you get material more nearly up to grade inspection at destination, because there it is easily done by the foreman or assistant foreman of your lumber yard, and it practically costs you nothing. Where you maintain a force of inspectors in the field, in many instances it is very remote from your road, and it costs a lot of money. I think all of you ought to give that careful consideration.

A motion that the report be adopted was carried.

Report of Committee on Rail, Handling and Distribution

In the records of proceedings of the Railway Storekeepers' Association of 1916, a recommendation was made in favor of the short ton of 2000 lb. and the discontinuance of the unit of 2240 lb. in reporting and accounting for quantities and values received. It was anticipated that something definite could be incorporated in this report regarding the subject, but such is not the case, and further than emphasizing the recommendation the committee can only add that the time appears to be ripe for definite action on the part of all railroads to make this standard practice.

New Rails—Handling and Distribution

The stores department does not maintain labor gangs sufficient for the purpose of handling or distributing rails. Such rails should be and generally are shipped direct to destination, and all the work incidental to handling and distribution should be done by the track department through the regular section or extra gangs and the expenses involved distributed directly to the job and accounts concerned.

As a general rule it is stores department practice not to take cognizance of material until it reaches destination from the consignor and the committee is of the opinion that the stores department should handle all invoices, shipping, and other records connected therewith.

When a railroad receives sufficient quantities of rail, it is good practice to decide on the points where long stretches of rail should be taken out and new rail put in, special shipping instructions being given for each lot of rail to destination. If only small shipments are possible due to inability of mills to supply or from other causes, it is more desirable to ship the complete allotment for an entire district to one point, and make distribution according to requirements at the time of receipt of rail.

The weight of present-day new rails has made it necessary to resort to mechanical means to unload them and inquiries of a number of roads show a variety of devices used, such as rail loaders, various types of locomotive cranes, ditching machines and steam derricks, some of the last three types being made at local shops. Obviously the machines used will depend upon the tonnage to be handled. It is the opinion of the committee that economies could be effected on many roads by a more general use of these mechanical aids than is now observed.

The unloading of new rails into stock piles is not an economical operation—they should be unloaded by distributing them along the tracks. When loaded into box cars, it is more economical to unload on to flat cars before distributing.

Released Rails (Fit)

Distribution—Those not required for immediate use should be concentrated at division or general division points to be inspected, sorted, resawed when that is the practice, and stored ready for prompt shipment as ordered.

Inspection—Theoretically, no doubt, this should be made by the m. w. & s. dept., but as it is chiefly done at yards in charge of the stores department, it is more convenient and satisfactory to have it done at such yards or docks by stores department inspectors, whose qualifications should be satisfactory to the engineering department. The rails should be determined to be fit for use: (1) In main tracks. (2) In main tracks of unimportant branches where the smoothness necessary to fast passenger service is not required and yard running tracks and passing sidings. (3) In yards and sidings in which there is no movement of passenger or fast freight trains.

It would be advisable for these three classes to have standard designations, with identification marks generally understood. Tentatively, the committee suggests painted ends, green for the first class, white for the second class and red for the third class. It will be necessary to further differentiate not only by section but by height denoting the amount of vertical wear as determined by a gauge to the nearest 32d of an inch; this may be done by Roman numerals, I, II, III, IV, painted on the web of each rail.

Handling—At the rail docks, fit rails should be piled, each class and the subdivisions of each class by themselves. The piles should consist first of rows or layers parallel to the track, as wide as the length of a rail. One set of ends should be neatly lined up to permit ready counting and measurement. The area of the supporting stringers should be such that the load on the ground shall not exceed one ton per square foot. Upon the bottom layer of rails stringer rails over the supporting stringers should be laid, upon which the next layer of rails parallel with the track should be placed just like the bottom layer. This process may be continued to a height as great as the loading or unloading machine will operate. The best apparatus for such a yard or dock is probably a gantry crane with runway. It is probable that railroads lose a great deal of money annually for want of apparatus to handle fit rails economically.

Scrap Rails

Inspection and shipping of Scrap Rails are frequently left to the discretion of supervisors or roadmasters and it is suspected that this has resulted in the sale of a great deal of rail as scrap which the purchasers have reclassified and sold as fit. All rails alleged to be scrap should be concentrated at division, district or general stores, and should be reclassified or otherwise disposed of from such points only.

The report is signed by A. A. Goodchild (Chairman), C. P.; R. D. Long, C., B. & Q.; J. W. Taylor, C., M. & St. P.; G. W. Snyder, 11, Pennsylvania; C. L. Wright, M., K. & T., and E. N. Bender (Chairman Ex-Officio), C. P.

Discussion

J. G. Warnecke (I. C.): We have at Centralia a plant where I find that we made a great saving in rails. I believe every railroad should do more of this. We have a building 60 ft. by 120 ft. with platforms at each end about 200 feet long. We have the rail conveyor system and skids used to move the rails from the platform to the plant. We use a derrick to carry the rail, operated by compressed air. In rolling rail, they use skids in preference to the derrick. The time to saw a 90-lb. rail is 21 sec. The capacity is about 10,000 feet in 8 hours.

During the month of April, the cost was $13,523.66. There are about 21 men usually employed, and we find that the cost is less than $1 per ton, where they have plenty of rails to keep them busy.

J. G. Stuart (C. B. & Q.): We have a large rail mill on the Burlington at Galesburg and another at Havelock, Nebraska. We saw a great deal of our rail. The rail is released on the road, and the store department has charge of it. The store department gives instructions to the superintendent to pick it up and ship it to the point where it is to be used. If it is to be sawed it is shipped in to either Galesburg or Havelock, according to the haul where it is to be used and sawed. It is shipped from there to points where it is to be used. We make a specialty to send rail out in pairs, that is, if we have a rail shorter than the standard, we save that rail until we have another rail of that length—then the two short rails are put on one side of the car, so that when we unload they will be opposite each other and make no carry. In inspecting our rail we inspect it according to No. 1, 2 and 3 grades. The No. 1, of course, going to the higher grade lines; the No. 2, to the lower grade lines, or to the important leads in yards, and the No. 3 to the unimportant tracks. The same grading is carried on whether the rail is to be sawed or laid in its present condition. If it is to be sawed it is marked so that the men picking it up know exactly where it should go. In addition to inspecting these 1, 2 and 3 grades, we inspect it as to its height. By picking all the rails that would come to one height, and making a differentiation of 1/16 in. we get a decidedly better track. It adds a little extra cost, and work at the mill, but when we send out rail we know that it is all within a 1/32 in. of the same height. The second rail of the same grade is just as good as the first, except it is a little bit lower, and by putting the low No. 1 in a stretch and the high No. 1 in a stretch, we get a better road. We aim also when sending out our rail to send out the necessary fittings, the spikes, bolts, tie plates and angle bars. If

it is a job of several miles we do not attempt to put the amount of angle bars on the same car, but where it is a small job we send everything complete on one car. Our management thinks we get wonderfully good results from the sawing of the rail.

G. W. Snyder (Pennsylvania): While the committee has claimed responsibility for the figures given as to cost of resawing, etc., at Savannah, we have not the cost. We did not have the data necessary. While the St. Paul people say their cost was 49 cents a ton, the figures that we saw at Galesburg indicate that the C., B. & Q. costs were about $4.50 a ton. The members accepting this report and talking to their officers about establishing such a thing, had better take the C., B. & Q. figures, which are something like the truth.

A motion that the report of the committee be adopted was carried.

Tuesday Afternoon Session

The meeting was called to order by Chairman Pearce at 2.30 P. M.

Action on Scrap Classification Report

Chairman Pearce announced at the commencement of the afternoon session that the committee which retired to complete its work has returned and that a motion was in order. *A motion that Subject 10—Scrap Classification, be accepted as amended, as recommended practices and the committee continued to make such further changes as may be necessary was carried.*

Report of Committee on Buildings and Structures

THE COMMITTEE finds that the subject matter assigned to it was handled in so thorough a manner by the committee reporting in 1916, that this report is based very materially on the former report, bringing out at this time such additional recommendations or matters that have come up subsequent to the above date.

Buildings

The members of the committee have had the opportunity of visiting many store properties, and can speak authoritatively of the tremendous loss to the railroads due to the lack of facilities for the proper storing of materials. It is felt that this matter has not been given the attention it merits, on many railroads, and the committee most emphatically urges that this question be constantly agitated and figures and facts be presented in all cases requiring additional storage, and the need of same clearly set forth by detailing damage and losses to material and supplies on account of lack of proper facilities, which were never more urgently needed than now on account of the greatly increased cost of material and supplies. The need of fireproof storehouses and facilities to properly and economically handle materials so as to eliminate loss from fire, obsolescence, etc., is emphasized.

It is recommended that future improvements should be along a definite, practical and established line of standardized facilities for each road. Each road should decide upon standard types of buildings for various purposes, shelving for use at various types of stores, standard racks for such material as sheet steel, bar iron, tools, knuckles, castings, etc., and issue blueprints for each facility representing the most efficient and practical design.

The committee believes that the matter of facilities such as buildings and yards for the handling and storing of maintenance of way material has been seriously neglected. Such layouts should consist of the necessary trackage to permit of storing of lumber, piling, posts, switch ties, cross arms, frogs, switches, fittings of all kinds, signal materials, wire, etc., and buildings for the storing of lime, cement, finished lumber, and other small and valuable materials.

Generally speaking, the yard or docks for the handling of maintenance of way scrap should also be located at such yards.

Location—The proper location of store facilities and future extension should be given due consideration in order to reduce to a minimum the cost of delivery of materials. In all cases, in locating store facilities consideration should be given to their proximity to repair tracks, shops, roundhouses, etc., which they are to serve, and to the necessary trackage for receiving and shipping material. Properly constructed driveways should also be provided.

Basement, and Additional Floors—The committee finds that in the construction of a building the question of a basement should be very carefully considered, dealing particularly with the question of light and dampness. Where basements are found essential, all the light and heat necessary should be provided to properly protect materials stored therein.

An additional floor or necessary space is recommended, where possible, for the assembling of material complete before shipping to a job or location. This is another phase of railroad storekeeping that has not been given the attention it deserves and the railroads have lost thousands of dollars on account of material shipped incomplete.

While not within the province of this committee to enter into a thorough discussion of this phase, it urgently recommends that such additional space be considered when contemplating additional buildings or alterations.

It is recommended that walls of buildings be constructed of sufficient strength to permit additional floors when necessary.

Fire Protection—The committee recommends filling in or boarding up under all platforms in order to reduce the fire hazard. It also recommends, for proper protection, the placing of sufficient hose houses throughout the yards and around buildings, also standpipes with proper connection, sufficient hose and fire extinguishers in buildings, and further that all roads fully comply with the rules and regulations prescribed by the National Board of Fire Underwriters.

Floors—The committee, after additional study, especially recommends that the following govern in reference to the load to be carried on various floors: The ground floor and platforms of all buildings should be constructed so as to carry any load that may be stored thereon, the second floor to carry 1000 lb. per square foot, and all additional floors to carry 500 lb. per square foot.

Ventilation, Heat and Lighting—The committee find that ventilation should be given more study, not only dealing with the storage of materials but even more so in the housing of employees. The committee recommends that a study be made of the various systems and methods of ventilation when erecting or altering building, and that proper arrangements be made for natural light and correct installation of artificial lights so as to bring about the utmost saving in labor in the handling of material.

Cases—The committee urges the elimination of any shelving that requires the use of ladders, and recommends, where necessary to have a partition in the center of the shelving, that netting be used, which will admit better light and air, add very materially to the lighting effect of the store, and make it more convenient to keep the shelving clean, which can be done with compressed air; it also entirely eliminates any dark corners. In many instances it will be found preferable to not use any partition and thereby get more flexibility out of the shelving. Steel shelving gives 20 per cent. more space than wood construction. Shelving should be built independent of the floor, so as to permit of rearranging when necessary, making the storage space more elastic. Only sufficient space for trucking and necessary work should be allowed between the cases; allowing more space invites storing of material therein, a practice which should not be permitted.

Platforms—Platforms around buildings should be not over eight feet wide, which will allow sufficient trackage space. They should not be used for storage.

Inside Finish—A gloss white or enamel finish is recommended for the outside of shelving and inside of the pockets of same where the nature of the material warrants, except that the counters and the first 6 inches from the floor should be painted black; also for inside of buildings to within 5 feet of the floor, 4 feet 6 inches of which should be pearl grey and 6 inches from the floor to be painted black.

Casting Platform

The committee recommends serious consideration of the so-called unit system of platforms now in use on some railroads. These platforms vary from 4 to 8 feet in width, are about 6 inches above ground level, and any length necessary according to space available, and with sufficient gravel, cinders, or otherwise prepared ground space between, to permit of trucking.

This system eliminates possibility of material being piled so as to interfere with tracking, permits of economical platform repairs, and adds to the appearances of all material piled.

Trucking on the ground reduces materially the maintenance of the platform as it prevents the wearing out of same.

More attention should be given to cases or shelving for the storage of small castings, forgings, etc., which are usually piled outside. Properly constructed cases will protect material, permit of piling to accomplish ready count and to allow a neat and orderly condition to prevail at all times.

Oil House

The committee recommends that at small stores the oil house be placed under the building or platforms with necessary retaining walls for fire protection, tanks to be equipped with necessary pumps so located as to permit the issuing of small quantities of oil at the counter in the store proper. The committee suggest cancelling previous recommendation that oil houses be not located within 200 ft. of any other building, and as a substitute that the local building ordinances be observed.

Tanks—The committee recommends storage tanks at district and sub-store houses of sufficient capacity and so located and equipped as to permit the shipment of oils from the main distributing store in tank cars, thus one car supplying, if necessary, two or more local points.

Storage tanks should be of sufficient capacity at all points where consumption warrants, such as section tool houses, coal chutes, pumping plants, signal towers, etc., so that oils or gasoline can be delivered direct by tank cars in supply trains or local freights. Such installation will tend greatly to reduce operating expenses through the discontinuance of the ordinary shipping drums, which are very expensive to handle at all points, and also causing great loss through leakage.

Pumps—From further study the committee recommend, where conditions warrant, the installation of self-measuring pumps and modern oil handling equipment in oil houses, paint shops, etc., tending to produce a saving in labor, elimination of fire and personal injury hazards, saving in space required, and resulting effect of cleanliness, order and neatness upon employees generally.

Buildings for Explosives

Bulletin No. 5 of the Railway Fire Protection Association states that buildings for fuses and torpedoes should be preferably 40 ft. from other buildings or lumber storage. The entire situation relative to the storage of explosives, is, however, usually covered by local, state and city ordinances and laws, and any report adopted must be subservient to the above.

Where the laws will permit, the committee recommends the construction of reinforced concrete vault with proper ventilation, equipped with steel doors and necessary partitions for the storage of fuses, torpedoes and matches, to be built inside of the storehouse proper.

The report is signed by U. K. Hall (Chairman), U. P.; G. J. Fleisch, A., T. & S. F.; J. E. Byron, B. & M., and D. C. Curtis (Chairman Ex Officio), C., M. & St. P.

Discussion

U. K. Hall (U. P.): The report in detail is based very largely on the report that was adopted at the convention in Detroit, with such new subjects as have come up since that time. The principal feature is the one that was developed in our investigations during the period of federal control and the practices that were found to exist. It developed there was absolutely no standardization of structures or fixtures on many of the roads, not only the smaller roads, but the larger ones as well. The principal theme of this report is the recommendation of the study and installation of common standard practices on the various roads. That is, a road will adopt a certain type of building or a certain type of shelving and then work toward that common standard practice, realizing that it cannot be done all at once. By establishing practices and bringing out through blueprints a theory showing the type of fixtures and structures, anything that is done is done along a definite line, and that is the particular basis of this report. Under A-14 there is a slight typographical error. It reads: "Platforms around buildings should not be over eight feet wide, which would allow sufficient trackage space." That should be "truckage" space. There are some radical changes here from many of the practices followed on the roads.

G. G. Yeomans (N. Y., N. H. & H.): I am just as much in favor of fine buildings and good equipment as anybody possibly can be. The only point that occurs to me is that elaborate buildings are not necessary for good storekeeping. A man can control his stock and can handle and distribute it just exactly as well without elaborate buildings and elaborate machinery for handling, if he uses the proper methods and if he has the proper organization and the right methods. Of course, that is going to be a very much more expensive way of doing it—there is no question about that—it is going to cost you a lot more to do it that way, but where the buildings and the equipment play their part is in reducing the labor cost and not necessarily affecting the amount of stock which you are obliged to carry on hand. I do not know that I can say any more than that.

C. D. Young (Penn.): It is not necessary to have fine buildings to make a fine storehouse. Some of the best kept storehouses are in some very poor buildings. However, there should be some guide for those who have sufficient funds to build, to determine what they shall do when they come to spend the money for new buildings. I understand that to be the purpose of this report. The report is one of great value. In going around over the railroads you will find structures built within the last ten years that certainly are not recognizing the desirability of low ceilings and low bins, avoiding step-ladders to get to the bins, so that you may know what stock is in the sections. During the war the Government developed some very good designs for warehousing and storage houses, and if this committee is continued it might be well for it to review the work of the quartermaster's department of the army, and see if there are not some points that can be obtained from standard construction warehouses and storehouses that would be of very material advantage to our association. Much study was given to the construction of these buildings. They are not expensive, they can be made fairly fireproof, and the handling of material in and out of the buildings can be done in a very expeditious and cheap manner. Generally speaking, it requires a large location to carry out the Government's scheme of warehousing, and that would prohibit the consideration of a sub-store, so this is a problem as between the general warehouse and sub-storehouse.

There is a diagram of material racks in the last part of the report which coincides with my view. One thing is omitted from this diagram, however, that I think is desirable, and that is to set between the maximum and minimum the aisle spacing between racks. In discussing this question with the storekeepers, you can find views varying from 24 in. to about six feet as to the width of the aisle between racks. Certainly that is too wide a divergence. The man who wants six feet is wasting valuable floor space, and the man who wants two feet is not getting his material in and out in an economical manner. It would be of assistance to us to know what that should be. If you have the same limitation on the width of aisle in using the width of material racks as specified, then a general construction can be worked out, spacing the columns in the buildings so that they will come in proper relationship to the aisles and bins. Too many buildings have been built with the posts put in before it was known where the material racks were to be put in.

Mr. Hall: Under A-13, Cases, we recommend that shelving be built independent of the floor, to permit rearranging when necessary, making the storage space more elastic. I can quote an instance that came under our observation just re-

cently where a store building was organized 165 feet long and afterwards cut down to 100 ft. The same amount of shelves are in that 100 ft. that were originally intended to be put into the 165 ft. The shelves are too close; there is about 2½ ft. in the aisle. If there was plenty of room, 65 ft., it would permit working space.

But that is the one feature of having shelving built independent of the floor. The shelving can be arranged according to the needs. We have also called attention to the so-called overhead lighting, or transom effect. There are no windows except above the shelving and that permits putting the shelving in any position on the floor. Mr. Young's question is one that would have to be solved according to the conditions.

A motion was made that the report be adopted as recommended practice and the committee continued.

Mr. Hall: You can get the finest results in the world out of shelving having absolutely no partitions, but there are certain items where it is necessary. The mesh and the gauge must be dependent entirely upon the character of material that is to be stored there. It must be heavy enough to meet the weight and if it is light material, there is no use going to the expense of a heavier gauge.

Mr. Yeomans: I would like to ask Mr. Hall if he differentiates between shop scrap and maintenance of way scrap. If he proposes to have one yard for shop scrap and another yard for maintenance of way scrap?

Mr. Hall: It would depend upon the geographical location and the direction in which your scrap was going for the market. If you had maintenance of way material all located on your railroad at such a place that you would have to haul your scrap right past that point to reach the market, I would say it could probably be arranged to take all your scrap. On the other hand, if scrap would go in the opposite direction you would probably handle your mechanical scrap at the shop yard. And in practically all cases it would be necessary to handle your mechanical scrap separate from maintenance of way scrap.

A motion that the report be adopted was carried.

Report on Standards

PRECEDING the showing of the pictures of the supply train in operation, F. D. Reed, vice-president, Chicago, Rock Island & Pacific in charge of purchases and stores, read his report on Subject 17, Standards. Mr. Reed commented as follows on this report: "I feel that this subject should not have been referred to the committee on standards, but should have been referred to the committee on lumber. Their subject is lumber, purchasing, inspection and distribution, and as that will require a great deal of detailed information to get up the report I would recommend that that be referred to that committee. I shall be glad to submit to them the data I have received for their information and guidance."

A motion that this report be adopted was carried.

Supply Train Pictures

Moving pictures of the Southern Pacific supply train were shown by J. E. Peery, general stores inspector, Southern Pacific.

Mr. Peery: These pictures were made along the Southern Pacific route. They were taken at various times and put together and not all the advantages of the supply train are shown. There are many titles which we have not attempted to film because it would go into 13 or 14 reels. The Powers Proection Machine Company of New York have kindly consented to furnish the projection machines, the same as we are using on the Southern Pacific.

Report of Committee on Supply Train Operation

THE COMMITTEE recommends the following:

1. Essential features of supply trains are services of supply and delivering materials to points where required for use.

2. Where an article is exchangeable, the old article should be turned in at time delivery is made of new.

3. The basis of quantities of supplies to be delivered rests with the originator of requisitions, subject to joint check on the ground at the time of delivery by the supply train operatives and consignee.

4. It is desirable to notify consignee in writing in detail of items delivered at time delivery is made.

5. Where check of conditions on the ground shows necessity of change in original requisition, correction must be made at time of delivery.

6. Under present conditions it is recommended a thirty-day schedule is most desirable.

7. New material not required on line, also scrap, wastepaper, and obsolete material, will be loaded on supply train each trip.

8. The supply train should be used wherever possible to eliminate work trains.

9. All company material, of any nature, even in carload lots, should be delivered by the supply train when possible, and set out at stations or sidings where required, in order to eliminate handling in way freights.

10. To make the operation of the supply train most effective and result in maximum economy of the company maintaining it, all unapplied material (including stationery) should be under control of the general storekeeper as to concentration, distribution, etc.

11. In order to properly inaugurate supply train on a railroad, it is essential that practical men be directed to observe the operation of such practice or unit on some railroad where practice is in vogue.

12. In busy and congested territories, it is desirable that all company material which can be delivered through the medium of the supply train be so handled, in place of handling through local freight houses and on way trains.

13. The following items are to be delivered by supply train: All of maintenance of way material, including frogs, switch points, switch stands, continuous joints, bolts, spikes, etc., less than carload lots of lumber, bridge and building hardware and material for assembled jobs, push, hand and velocipede cars, warehouse and baggage trucks, mail carts, crossing and right-of-way signs, etc., Distillate for pumping plants, gasoline for section and signal maintainers' headquarters, lime and soda ash for water-treating plants, coal for station agencies, ice for use in stations, sections, b. & b. gangs, etc. (where not contracted for local delivery), all oils used in signal, m. of w. and b. & b. departments, as well as pumping plants and station agencies, miscellaneous material required for maintenance of signal department, pumping plants, station agencies, etc., all small outside stores in supply train territory to be supplied, and all other substores where possible.

14. It is further unanimously recommended that supply train service be extended and adopted on all railroads. The committee submits as a basis for this recommendation the following statements of cost of efficient supply train operation versus other methods. The savings brought about by good service have not been considered in these statements, as this element cannot be computed in dollars and cents.

STATEMENT SHOWING COST OF OPERATING SUPPLY TRAINS

	Monthly
Labor at stores in loading supply train	$500.00
Wages of supply train storekeepers and helpers	1,085.00
Personal expenses of supply train storekeepers and helpers and store department proportion of expense incident to performance of cook and living cars operated in connection with supply trains	550.00
Charges from transportation department for wages of train and engine crews, roundhouse expenses, and other incidental expenses; also fuel	4,700.00
Track laborers accompanying supply train	600.00
Total	$7,435.00

STATEMENT SHOWING ESTIMATED COST OF HANDLING BY LOCAL FREIGHT MATERIAL NOT DELIVERED BY SUPPLY TRAIN

	Monthly
Estimated cost of overtime to local trains and engine crews, if material was handled by local freight	$3,280.00
Estimated cost of local freight houses of handling, transferring and billing (on basis of 50% of material passing through freight houses), at 57c. ton	1,681.00
Estimated loss account material damaged or lost in transit, etc. (using as a basis 3% of material delivered)	420.00
Estimated cost of picking up scrap and cost of handling, sorting, etc., at division stores, before shipping to general scrap headquarters, also overtime to local freight train and engine crews	2,500.00
Approximate cost of packing, tagging, loading, waybilling, etc., at shipping stores	5,040.00
Stock on hand would have to be increased at all division stores approximately $160,000, if each had to provide for their division requirements. (Interest on investment at rate of 6% per annum)	800.00
Estimated value of additional track tools, hand, push and velocipede cars, which would be required on line if no regular exchange system was in effect, $64,000. (Interest on investment at rate of 6% per annum)	320.00
Estimated cost of motor car maintenance and operator for use of watch inspectors on monthly trip of watch inspection	255.00
Estimated cost of doing work by work train, such as distribution of ties, gravel, ice, sprinkling right of way with fuel oil, etc., which is now handled by supply train	1,125.00
Estimated cost of labor necessary to deliver material from freight house to section and signal tool houses, B. & B. and extra gangs on line, etc	3,600.00
Total	$19,021.00

The report is signed by A. S. McKelligon (Chairman), S. P.; J. E. Perry, S. P.; W. Dixon, M. P.; H. P. McQuilken, B. & O.; L. G. Pearson, E. P. & S. W.; C. A. How, M. P.; J. P. Murphy, N. Y. C.; R. C. Harris, Pennsylvania; I. L. Ward, Pacific Electric; U. K. Hall, U. P., and D. C. Curtis (Chairman Ex-Officio), C. M. & St. P.

Discussion

D. D. Cain (Sou. Brass Works): I was storekeeper at Bakersfield on the Southern Pacific 17 years ago. Mr. Pearce, then a young man from the East, started the idea of the supply train and it grew and grew and it was not more than three or four years until the superintendents began to put their private cars on the rear end to go over the line. I wish you men who have really no knowledge of the supply train could take your managers to the Pacific Coast and see how they really operate and deliver supplies. It would be a revelation to you.

Mr. Burr: In delivering material on a requisition, if you are short of supplies what action is taken to furnish them?

Mr. Peery: We carefully check and wherever possible we do without delivering the material, but if we find that we have to issue some, we divide it up between the places where it is needed.

Mr. Hall: I have seen the Southern Pacific train in operation, and I have seen our own train in operation. Our management takes the stand that the supply train is one of the biggest operating assets to the railroad. These trains permit monthly inspection, they permit even distribution of supplies.

Mr. Bushnell: I would like to ask whether on 9,000 miles, it would require three trains?

Mr. Peery: It would require four trains. We have four trains on the Southern Pacific.

Mr. Stokes: The Illinois Central operate three supply trains that run monthly.

J. G. Stuart (C. B. & Q.): Our experiments with supply cars a number of years ago were not at all satisfactory. They were not operated as a train, but were attached to a local freight. And the experiment, while having some good features, was not at all satisfactory at that time. We have made too much of an effort in getting up our figures to show a money saving. While we did see a splendid saving on the screen, it is doubtful if the actual money saving is as great as it might be shown. We should put more stress on the service and the moral effect on our employees rather than on the actual dollars and cents.

E. Harty (S. P.): In a general store the size of that at Sacramento, time is a great factor, and the elimination of way freight shipments and other shipments direct on the line will pay for approximately two-thirds of the cost of the operation of the entire supply train. That is a saving that is estimated from the experience we had in going from handling way freight shipments to supply cars, and from that to supply trains. The savings may not be as important in dollars and cents saved, but the elimination of this work that is necessary to prepare the shipment for the different divisions is a very great factor. The second factor is the fact that in operating the reclaiming plant and large scrap, many roads find themselves handicapped seriously by what they call the periodical cleanup, when four or five thousand tons of scrap is being shipped in in a very short time. The pictures as shown may have indicated to you the cleanly condition of the right of way on the Southern Pacific, which I consider remarkable.

Resolution of Thanks

A resolution was presented by Mr. Waterman, extending a vote of thanks to William C. Sproul, president of the Southern Pacific; A. S. McKelligon, general storekeeper of the Southern Pacific and J. E. Perry, his assistant, for affording the convention an opportunity to view the moving pictures of the supply train and reclamation plant of the Southern Pacific Railroad.

Adjournment.

Registration, American Railroad Association

Section III, Mechanical

Blair, H. A., Supvr. C. R., Allegheny Region, U. S. R. A., Alamac.
Davis, M. J., A. E. M. P., Penn., Princess.
Drawbaugh, E. L., Gen. Car Foreman, Penn., Chalfonte.
Enbody, A. B., M. M., Cent. R. R. of N. J., De Ville.
Foster, H. D., Gen. Auditor, C. B. & O., Chelsea.
Gallagher, F. S., A. E. R. S., N Y. C., Brighton.
Jones, C. H., M. M., Huntington & Broad Top Mtn.
Long, J. F., Dis. Maint. of Equip. Insp., B. & O., Schlitz.
O'Donnell, J. J., Gen. Foreman, L. I., Dennis.
Umpleby, C. H., M. M., St. Lawrence Div., Princess.
Wallace, L. W., Marlborough.
Walther, G. C., Gen. Foreman Frt. Car Insp., Penn., Alamac.

Section VI, Purchases and Stores

Barr, A. W., Div. S. K., Penn., Clyde.
Clark, R. C., Supt. For. Prod., P. & L. E., Traymore.
Clay, W. J., D. S. K., P. & R.
Criste, A. D., Div. Storekeeper, Penn., Phillips House.
Dwyer, J. A., Asst. to P. A., P. C. & I. Co.
Farraday, C. L., Gen. Mat. Agent, Penn.
Hayden, G. W., A. P. A., N. Y., N. H. & H., Traymore.
Hisatome, Yoshisato, Storekeeper, Imperial Government Rys. of Japan, Breakers.
Hough, J. H., Penn.
Hughes, E., P. A., Lehigh & New Eng., Pennhurst.
Jordon, John J., Lumber Storekeeper, D. L. & W.
Keane, E. L., P. A., P. C. & I. Co.
Keating, N. M., D. S. K., N. Y., N. H. & H., Schlitz.
Marshall, H. A., Sta., N. Y., N. H. & H., Princess.
Pembleton, H. V., D. S. K., N. Y., N. H. & H., Schlitz.

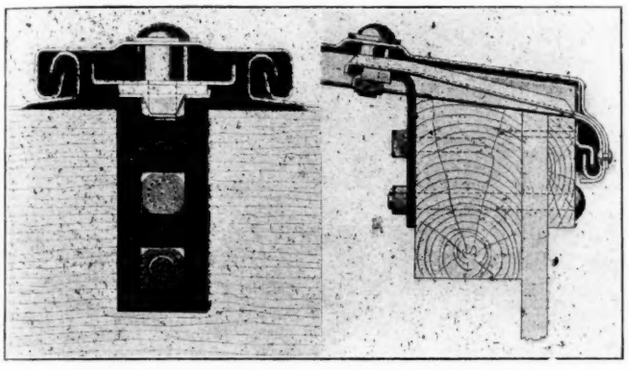
Special Guests

Anderson, B. T., Asst. Sig. Eng., D. L. & W.
Barnum, Ward, Ser. Elec. Eng., Interstate Com., Chalfonte.
Baynes, Peter T., Insp. Pass. Equip., Penn.
Blossom, H. F., D. Equip. Dept., N. Y. C.
Bingman, P. R., Gen. For., Penn., Blackstone.
Bissell, E., S. K., N. Y., N. H. & H., Schlitz.
Bixby, O. M., Asst. Eng., N. Y. C.
Bond, R. J., Div. Eng., Penn.
Boring, T. J., Gen. For., Penn., Craig Hall.
Boston, R. W., Car Repair Acct., B. & O.
Caruthers, E. W., Asst. Eng. M. of W., Penn.
Clarke, A. B., Gen. For., P. & R., Shelburne.
Coffey, J. E., For. Frt. Car Insp., C. R. R. of N. J., Lyric.
Cornell, J. Albert, Representative, Penn. R. R. Employees Magazine, Traymore.
Crowley, M. D., T. S. K., N. Y., N. H. & H., Erskine.
Doyle, Lester A., Stenographer, P. & L., Craig Hall.
Dyson, C. H., Fuel Agent, B. & O.
Ellenberger, E. G., Div. Storekeeper, Penn., Castro.
Erb, Chas. W., Div. Storekeeper, Penn., Clyde.
Ernst, Wm., D. Equip. Dept., N. Y. C.
Farley, L. M., For. Battery Plant, The Wast. T. Co., Elwood.
Foltz, T. F., Elec. Eng., Wash. Term.
Funnell, Walter, Gen. For. Mch. Shops, N. Y. O. & W., Dennis.
Geist, J. R., Spec. Passenger Car Insp., B. & O., Revere.
Gehert, Fred A., Penn.
Gehert, S. S., Gen. For., Penn.
Goike, Elmer J., Asst. Gen. Stores Acct., N. Y., N. H. & H., Schlitz.
Goldsmith, A. C., Gen. For., Penn., Bingham.
Guam, A. F., Mech. Eng., Traymore.
Gurnee, W. H., Gen. Jt. For., Cent. New Eng., Princess.
Hamilton, Geo., Supt. of Elec. Reprs. Mech., Erie, Mt. Vernon.
Hardy, R. A., Head Car Draft., P. & R., Elberon.
Hart, B. C., D. S. K., N. Y., N. H. & H., Princess.
Hassett, J. C., M. E., N. Y., N. H. & H., Wiltshire.
Hawk, E. Thompson, For. Engine House, P. & R., Monticello.
Heinmiller, H. O., Insp., B. & O., Schlitz.
Hengstler, D., Foreman, Penn.
Irving, H. E., Insp., B. & O., Schlitz.
Jenks, W. J., Gen. Mgr., N. & W., Marlborough.
Jones, Edw., Asst. Pur. Agt., Western Md., Wiltshire.
Kestenbaum, Maurice C., Stenographer, P. & S., Craig Hall.
Kline, W. R., Stenographer Office Ch. M. P., Penn.

New Devices Among the Exhibits

All-Steel Flexible Roof

THE HUTCHINS CAR ROOFING COMPANY, Detroit, Mich., is exhibiting models of all-steel flexible roofs for new box cars and for replacement on old cars, both models incorporating recent improvements. Of particular interest is the design of the all-steel flexible roof as adapted for replacing inside and outside metal roofs on



Sections Through Ridge Pole and Side Plate

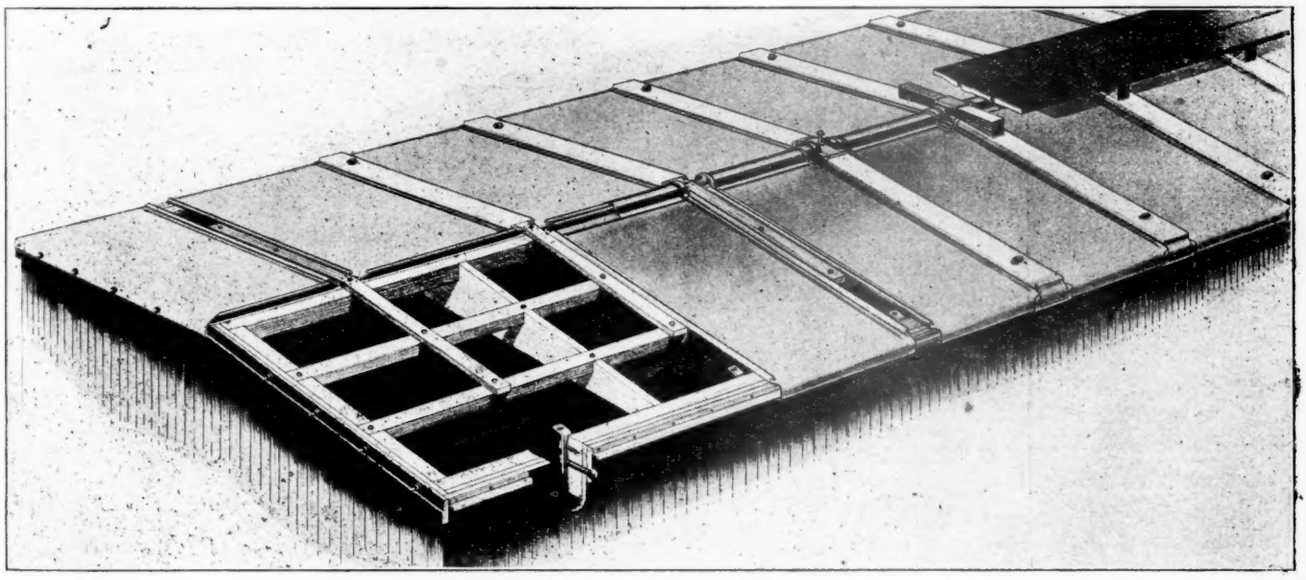
old box cars. The latest improvement of this design is in the method of interlocking the roof sheet flanges and transverse joint cap flanges to insure a weatherproof joint, even though the surfaces on which the roof sheets are supported are irregular, as is apt to be the case on old cars. The method of fastening the joint caps to brackets located on the inside surface of the side roof plates has been improved to give a weatherproof joint even in case there is considerable variation in the distance from the upper surface of the purlines to the carlines.

This replacement roof, made of No. 18 or No. 20 gage steel, galvanized, is intended to be placed on top of the old wooden or steel carlines and the old purlines and ridge pole and because the surfaces so provided are very apt to be irregular, it was considered best to interlock the roof sheet flanges with the transverse joint cap flanges to insure weather-proof joints as shown in the sectional view. This illustration shows also the shoulder bolt which is riveted to the joint cap. The shoulder of the bolt rests upon the side plate bracket, the eaves re-enforcing piece being placed between the shoulder and the bracket, and when the nut is drawn up on the shoulder bolt the joint cap and re-enforcing piece are secured to the bracket. The other section is taken transverse to the side plate and shows clearly the bracket located on the inside face of the side plate, the fastening of the joint cap and re-enforcing piece and the engagement of the eaves flashing with the return bend of the roofing sheets and joint caps.

Instead of the customary lapped joint a double locked joint with considerable vertical and side clearance is made between the joint caps and the side roof plates. The caps are slid into position after the side plates are in place and the special roof cap consolidates the structure and makes it entirely weatherproof.

The Locomotive Booster

ONE OF THE MOST significant locomotive developments of the year calls for a revision of thought. The old slogan "Be a booster" has appeared in a new dress; it's now, "Adopt the booster"—a two-cylinder, horizontal engine geared to the axle of any locomotive trailer, adding to that locomotive 28 per cent in starting efficiency. No, you're wrong. It has nothing whatever to do with the old dream-book scheme of lift-



Arrangement of the Sheets and Joint Caps

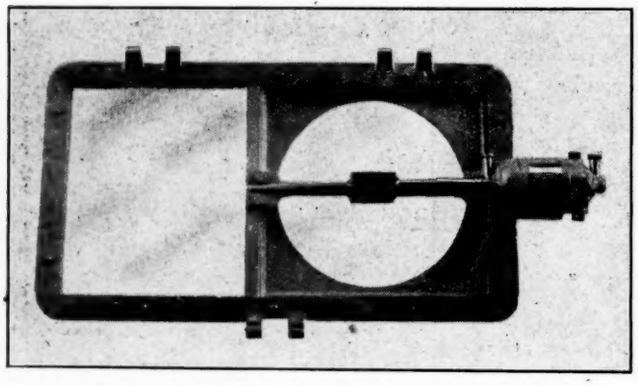
ing the weight of the engine off the trailer and engine trucks, thus overloading the driving boxes. It's merely a clever means of utilizing the inactive tractive force which you never thought was there. Photographs and drawings are being shown in the Franklin Railway Supply Company's booth, and a locomotive equipped with it will be found on the railroad track on Georgia avenue.

The locomotive is No. 3149, a big 4-6-2 of the New York Central. If, on account of a poor head for figures, you are unable to appreciate Frank Peter's statement that No. 3149's tractive power of 36,000 lb. is 47,000 lb. with the booster "cut in," climb up on the foot plate and talk to Engineer George Spink. He will tell you that he fools the brakemen along the line who, to the usual difficult and frequently impossible start of a too heavy train, disregard his advice to "get aboard" and "get left" instead.

He will show you an absence of complications in the cab and explain that if it was not for the quick get-away and the sound of the exhaust of the trailer's two-cylinder engine through and out to the rear of the tender, he might forget the booster was there. He will start with his lever full forward and call your attention to the action of the trailer engine as it does its added 28 per cent in its oil and dust-proof case underneath. When he "hooks her up" you may not realize at first how it is done, but the trailer emerges from its new role of a pusher and automatically resumes its old function of the trailer that you know.

A New Type of Clear Vision Window

THE PROBLEM OF INSURING a clear vision for enginemen during rain or snow storms has received considerable attention. While the provisions of the Locomotive Inspection Act require the roads to equip locomotives with a small hinged pane in the front cab window, this has met with considerable objection. It is, therefore, interesting to note that a device for providing an unobstructed view under all conditions, based on a new principle, is being exhibited in the booth of the De-

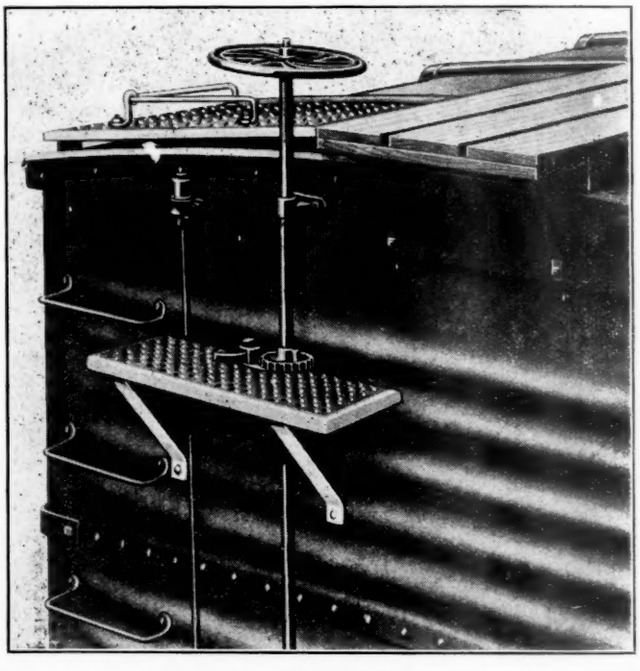


Clear View Screen Fitted to a Cab Window

troit Lubricator Company by the Chadburn Ship Telegraph Company, Troy, N. Y. This device, which is known as the clear view screen, consists of a glass disc rotated rapidly in its own plane on a central bearing by electric power at such a speed that rain, spray or snow are instantly thrown off and perfect transparency is maintained. The speed required is not excessive, being about 1500 r. p. m. The motor and frame can be mounted directly on the window and the clearance around the screen is so formed that it is impossible for rain or spray to drive through. No loss of light or definition can be detected from the screen up to the point where the glass makes an angle of 60 deg. with the line of sight. The clear view screen has been applied to locomotives on British railways, the illustration herewith showing the arrangement used on a Northeastern Railway locomotive.

Safety Tread for Brake Step and Latitudinal Running Boards

THE SAFETY OF TRAINMEN makes it desirable to provide a firm footing and a non-slipping surface on the tops of cars, and particularly on the hand-brake steps and latitudinal running board extensions. Wooden platforms and running boards become very slippery in wet weather and often shrink or split, allowing the boards to become loose or detached. To overcome these defects the Dunbar Manufacturing Company, Chicago, is manufacturing hand-brake steps and running board



Non-Slipping Pressed Steel Brake Step and Running Board Extension

extensions of pressed steel having the Kass safety tread surface. This tread consists of small bosses pressed on a plate, ⅛-in. holes being perforated through the center of each boss. The raised buttons make the tread non-slipping and insure safety to trainmen applying brakes or climbing on or off roofs of cars.

The steps and platforms are made of ⅛-in. material and can be furnished of copper bearing non-corrosive steel. The size can be varied to suit the railroad company's standards and the brake step can be furnished with pawl, plate, pivot and brackets ready for application to the car, or without these accessories, as desired.

Mr. and Mrs. T. H. Symington, of Morristown, New Jersey, are at the Brighton. Miss Mae Breen, of New York, is their guest. Mr. Symington is the chairman of the board of T. H. Symington Company.